Free Flight Action Plan
Update II

November, 1998

Foreword

This report was prepared as an update to the earlier document entitled *Free Flight Action Plan* published by RTCA on August 15, 1996. It is intended to provide the current status of free flight initiatives as compiled by the RTCA Free Flight Steering Committee. The Free Flight Steering Committee was formed under the auspices of RTCA, Inc. at the request of the FAA and in response to the *Final Report of RTCA Task Force 3, Free Flight Implementation.*

The objectives of the Free Flight Steering Committee are:

- To establish an agreed-to implementation strategy and milestones;

- To periodically review government and industry progress in meeting implementation commitments, via the use of appropriate metrics; and

- To identify new free flight implementation opportunities as well as events/situations that are inhibiting progress and review actions that are taken.

As a private, not-for-profit corporation, RTCA, Inc. addresses operational concepts, requirements, and industry standards for aviation. The organization's mission is to advance the art and science of aviation, and aviation electronic systems, for the benefit of the public. Volunteers from the entire aviation community help develop RTCA products. These products include consensus-based recommendations addressing the implementation of new operational capabilities, performance standards, as well as technical guidance documents and special topic reports that focus on the application of electronics technology to meet the aviation community's needs. RTCA conducts essentially all its work while functioning as a Federal Advisory Committee.

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Joint Goals Statement

The overall guiding principles for moving toward mature Free Flight were developed over a 2 year period by an RTCA sponsored Select Committee on Free Flight involving both industry and Government representatives and by RTCA's Task Force 3 on Free Flight implementation. Task Force 3 approximately 250 representatives from the Federal Aviation Administration (FAA) and the aviation community. In October 1995, the task force published the following guiding principles:

- Ensure that the transition to Free Flight will not compromise safety.
- Expand the Free Flight definition to include strategic flight planning and ground phases of operation.
- Emphasize initiatives that give users a high return on investment.
- Ensure that the transition to Free Flight is benefits-driven.
- Emphasize the need for collaborative planning.
- Emphasize procedural improvements with proven technology.
- Consider end-to-end impact and benefits when planning improvements.
- Address human factors issues during all stages of development.
- Assess benefits when possible prior to implementation.
- Utilize modeling and analysis to anticipate operational impacts on the National Airspace System (NAS) users and service providers.
- Accommodate users with various levels of equipage during the transition to Free Flight.

The FAA and industry agree with the guiding principles. The joint Government/Industry Free Flight Steering Committee (referred to as the "Steering Committee" hereafter) shall agree to use these principles in deliberations and preparation of further recommendations on the implementation of Free Flight.

Free Flight Action Plan
Introduction

Background

On April 20, 1995, the FAA Administrator David Hinson, asked RTCA to "form a new task force, led by an appropriate representative from the civilian aviation community to develop consensus regarding Free Flight implementation." The task force completed its work in October 31, 1995, and produced a report, *Final Report of RTCA Task Force 3 Free Flight Implementation*, that further defined the Free Flight operational concept, evaluated the Free Flight architecture and technology needs, and identified an incremental transition to Free Flight.

Free Flight is an innovative concept born out of the need for increased user flexibility with operating efficiencies and increased levels of capacity and safety to meet growing demand for air transportation. This new concept of operation recognized the need to rethink the traditional notions of traffic flow management, air traffic separation services, and the classification of airspace itself. The Free Flight concept asserts that significant benefits can be achieved by concentrating on 1) removal of constraints and restrictions to flight operations, 2) better exchange of information and collaborative decision making among users and service providers, 3) more efficient management of airspace and airport resources, and 4) tools and models to aid air traffic service providers.

Free Flight Defined

Free Flight is defined as:

> A safe and efficient flight operating capability under instrument flight rules in which the operators have the freedom to select their path and speed in real time. Air traffic restrictions are imposed only to ensure separation, to preclude exceeding airport capacity, to prevent unauthorized flight through special use airspace, and to ensure safety of flight. Restrictions are limited in extent and duration to correct the identified problem. Any activity which removes restrictions represents a move toward Free Flight.

Task Force 3 expanded on this definition to include:

> This suggests that each user is granted both maximum flexibility and guaranteed safe separation. The goal is not only to "Optimize" the system but to open the system for each user to "self-optimize."
> Self-optimization is the key to understanding the extent of Free Flight's reach as well as Free Flight's challenges. Free Flight is not limited to airspace--its spatial constraints are chock to chock, but Free Flight reaches into a flight's prehistory by providing increased flexibility in flight planning.

In the broadest sense, Free Flight is the unrestricted opportunity for all to use the limited airspace in a manner that is efficient, effective and equitable. Future airspace capacity and management

must support the Free Flight concept to enhance safety, promote air commerce, minimize delays, while accommodating projected air traffic growth.

Collaboration on Implementation

The FAA has committed to a safe transition to Free Flight. The shared leadership between the FAA and the industry through the Government/Industry Free Flight strategy with the proper focus of activities and investments. Steering Committee will develop and carry forward the agreed-to implementation

Achieving Free Flight requires shared Government/Industry responsibility for implementing the actions necessary to achieve the joint goals associated with Free Flight and for measuring progress toward those goals. It also requires that government and industry reach consensus on system performance standards, transition strategies, and implementation milestones. Without mutual agreement on investment timing, neither the FAA nor industry will be able to move forward and attain the benefits that Free Flight promises.

Incremental Approach to Implementation

There is no doubt that changes to the NAS, the cockpit, and operations centers are necessary to implement Free Flight. The challenge before the Steering Committee is to develop a plan to implement Free Flight in a way that is technically feasible, affordable, and operationally sound. It is recognized that Free Flight will be implemented and mature over time.

Free Flight is characterized by many as being "benefits-driven" and "time-phased," or evolutionary. The Task Force 3 report illustrates an incremental evolution for near-, mid-, and far-term timeframes. This evolution represents an aggressive approach that takes advantage of technology and requires expedited establishment of requirements and standards, completion of prototype and operational testing, and progress toward acquisition and implementation phases of development. The incremental approach and the actions required to achieve it must reflect a balance between user needs and expected resource availability for both the FAA and the users.

Early Benefits

While an incremental approach to Free Flight is suggested, the aviation community cannot afford to wait for long-term development initiatives to produce benefits. Studies have estimated that the annual cost of delays to airlines are significant, reaching billions of dollars. Incremental development is expected to yield incremental benefits. In fact, there is considerable evidence that significant benefit to airspace users and service providers is achievable from near-term actions. The Task Force 3 report identified potential benefits associated with the transition increments along the Free Flight path. The reductions in delay and the improvements in operating efficiency inherent in Free Flight will translate directly into air quality benefits by reducing fuel burned on the airport, in the terminal area and en route.

The implementation strategy developed by the Steering Committee emphasizes what can be done in the near term and provides significant benefits at low cost and low implementation risk by using proven technologies. The implementation of the Free Flight concept must provide improved capabilities in the near term while simultaneously evolving the ATM system toward the full Free Flight concept.

Near term improvements must focus on expeditiously eliminating current air traffic restrictions, developing and implementing improved procedures to increase user flexibility and system capacity, and fielding existing capabilities that are ready for deployment or integration in existing NAS or user systems. Longer term improvements focus on evolving the ATM system through incremental improvements in automation and infrastructure that are designed to lead to the longterm vision of mature Free Flight. This combined strategy offers both near-term improvements and the long-term objective of substantially improved ATM system capabilities.

Introduction to Free Flight Action Items

The following pages contain actions planned or underway in response to the RTCA Task Force 3 recommendations contained in *Free Flight Implementation.* The tables are organized by Task Force 3 recommendation, grouped in near-term, midterm, and far-term segments as identified by Task Force 3. The first column contains the **RTCA recommendation** and its identifying number or letter, as defined in *Free Flight Implementation.* The recommendation is followed by **FAA/Industry initiative(s)**. These initiatives have been developed by the FAA and industry and reflect new and ongoing initiatives necessary to implement the recommendation. Wherever possible, a **start** and **complete** date are listed. The fifth column updates the reader as to the **status** of each initiative. Funding information is also provided, when known. The use of To-Be-Determined (**TBD**) applies either to a start or complete date where there is uncertainty. Some initiatives are ongoing, meaning that there is no completion date. If a status or funding block is blank, no information was available at the time this update was published.

The FAA Office is the organizational element that has responsibility for the majority of initiatives. The industry lead is to represent the industry in implementing the recommendation. Points of Contact are the FAA and industry representatives who are expected to know the status of work being accomplished, and are not necessarily those who are performing the work. Their phone numbers are also identified.

The FAA and industry points of contact have additional responsibilities. The FAA point of contact is responsible for keeping the Free Flight Steering Committee aware of FAA budget changes that have an impact on the implementation schedule of initiatives within a particular recommendation. Both the FAA and industry points of contact are responsible for identifying changes in initiative schedules and for keeping the action plan up to date.

Some of the recommendations have notes attached that relate to the initiatives.

Updated information on each initiative will be published at the following website:
www.faa.gov/freeflight/index.htm

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Listing of Accountable Persons

Rec.	FAA Acct. Org.	FAA Acct. Person	Industry Acct. Org.	Industry Acct. Person or POC	RTCA Select Comm. Advocate	Synopsis of Recommendation
1	ATO	E. Harrell	UPS Delta	B. Hilb K. Stover	M. Sinnet	RNAV procedures at congested airports
2	AVR	J. Enias	UPS NWA	B. Hilb F. Alexander	R. Taylor Boeing	Process to expand implementation of RNAV
3	ATO	M. Cirillo	UPS NWA	B. Hilb K. Stover	R. Taylor Boeing	Increase RNAV routes below FL180
4	ATO	J. Kies	ATA COMAIR	J. Ryan S. Rayborn	J. O'Brien ALPA	Implement NRP to FL290
5	ATO	J. Kies	ATA COMAIR	J. Ryan S. Rayborn	J. O'Brien ALPA	Decrease 200 NM ingress/egress on NRP
6	AUA	R. Voss	ATA	J. Ryan	D. Boone MITRE	Mechanisms to provide pre-departure feedback to users on flight plans
7	AUA	R. Voss	ATA Delta	B. Sears K. Stover	D. Boone MITRE	Implement ration-by-schedule for GDPs
8	AUA	R. Voss	ATA Delta	B. Sears K. Stover	D. Boone MITRE	Establish flexible GDP procedures and DSSs
9	ATO	E. Harrell	DOD ATA	F. Colson J. Ryan	P. Smith NBAA	Coordinated effort to improve civilian SUA use when not utilized by DOD
10	ATO	E. Harell	DOD ATA	F. Colson J. Ryan	P. Smith NBAA	Operational trial to test better information exchange on SUA status
11	ATO	E. Harell	DOD ATA	F. Colson J. Ryan	P. Smith NBAA	Implement real-time SUA notification from DOD to FAA to users
12	AVR	J.Williams	ATA	J. Ryan	B. DeCleen FAA	Streamline certification process
13a&b	AND	J. Link	ATA	J. Ryan	R. Climie Honeywell	Decision on initial data link, domestic and oceanic
14	AUA	R. Voss	ATA	J. Ryan	M. Jenny US Airways	Telecommunications to enhance information exchange/ FAA and users
15	AUA	R. Voss	ATA	B. Sears	M. Jenny U.S Airways	Airline schedules into FAA decisions
16	AUA	R. Voss	ATA	J. Ryan	J. Griffith FAA	Enhance/replace monitor alert
17	AND	L. Yee	ATA	J. Ryan	R. Climie Honeywell	Deployment of digital ATIS, automated taxi, expansion of PDC
18	AND	R. Wright	ATA	J. Ryan	R. Marchi ACI-NA	Standards for cockpit situation awareness display

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19	AUA	R. Voss	ATA	R. Hilton	E.Wolfe AAL	Ground-based conflict probe
20	AUA	R. Voss	ATA	R. Hilton	E. Wolfe AAL	Capabilities to improve transition to/from terminal airspace
21	AVR	J.Williams	ATA	J. Ryan	R. Covell ARINC	Feasibility of using GPS WAAS as en route vertical reference
22	ARS	D. Whatley	ATA NCAR NCAR	B. Sears B.CarmichaelJ. McCarthy	R. Covell ARINC	MDCRS to improve real-time weather Information
23	AND	R. Wright	NCAR	B.Carmichael J. McCarthy	R. Covell ARINC	Better weather forecasts
B	ASD	J.Scardina	UAL UPS	T. Stone U. B. Hilb	D. Castleberry Rockwelll	Consensus on role and timing of ADS-B
24	AUA	R. Voss	ATA	J. Ryan	J. Griffith FAA	Tools and methods to measure dynamic density
25a&b	AUA	R. Voss	ATA	B. Sears	M. Jenny US Airways	Cooperative exchange of information
26	ATO	M. Cirillo	ATA	J. Ryan	B. Cotton UAL	Procedures for aircraft-to-aircraft separation
27	ATO	E. Harrell	NWA	F. Alexander	R. Taylor Boeing	Precision missed and simultaneous approaches
28	ATO	E. Harrell	ATA	J. Ryan	D. Watrous RTCA	Explore two aircraft on runway
29	ATO	J. Kies	ATA COMAIR	J. Ryan S. Rayborn	J. O'Brien ALPA	Expand NRP below FL290
30	ATO	E. Harrell	ATA	J. Ryan	B. Cotton UAL	Domestic RVSM above FL290
31	ATO	E. Harrell	ATA	J. Ryan	B. Cotton UAL	Reduced en route horizontal separation
32	ATO	E. Harrell	ATA	J. Ryan	D Watrous RTCA	Remove 250 knot speed restriction in Class B
33	ASD	T. McCloy	ATA	J. Ryan	K. Grundman NATCA	Human response and perception to reduced separation buffers
34	ASD	T. McCloy	ATA	J. Ryan	K. Grundman NATCA	Real-time human in the loop
35	ATO	D. Johnson	ATA	J. Ryan	D Watrous RTCA	Re-emphasize AIP

Listing of Accountable Persons

MT1	ATO	M. Cirillo	ATA	R. Hilton	D. Helton NBAA	Increase total US navigational database
MT2	AND	D. Hanlon	ATA	J. Dorfler	D. Helton NBAA	GPS WAAS as primary navigation system
MT3	ASD	J. Scardina	ATA	R. Hilton	R. Climie Honeywell	STARS and DSR hook for ADS-B and data link
MT4	AND	R. Wright	NCAR	B.CarmichaelJ. McCarthy	Covell ARINC	Weather products to cockpit
MT5	ATA	Kalinowski	UAL	J. Holweger	J. Griffith FAA	Dynamic/adaptive sectors
MT6	AND	J. Link	ATA	R. Hilton	D. Castleberry Rockwell	ADS to support user-preferred trajectories in non-radar
FT1	ASD	J.Scardina	ATA	R. Hilton	R. Marchi ACI-NA	Surface surveillance
FT2	ASD	J.Scardina	ATA	J. Dorfler	D. Castleberry Rockwell	Future surveillance architecture
FT3	AND	C. McCullough	ATA	J. Dorfler	R. Marchi ACI-NA	LAAS capability increase CAT I, II, III approaches

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1. FAA, in cooperation with users, must develop new procedures which use airplane RNAV capabilities to reduce congestion over waypoints. Such procedures should be expedited for the top 50 airports.	a. The FAA and users will identify and develop area navigation procedures that will reduce congestion for the top 50 airports.	4/96	TBD	The top 50 airports, by IFR operations and by passenger count, were identified and given to the ATA FMS Advanced Applications Task Force's Production Work Group. At the July 1998 meeting in Montreal, each airport was discussed and each participating air carrier representative was encouraged to evaluate their presence at these airports and consider becoming "the lead carrier" at those locations. This effort resulted in an additional 20 airports having a "lead carrier" which brings the total to approximately 40 airports.	
1. FAA, in cooperation with users, must develop new procedures which use airplane RNAV capabilities to reduce congestion over waypoints. Such procedures should be expedited for the top 50 airports.~~1.~~	b. Define airspace locations and set priorities for analysis with user input. Sites will be determined according to traffic count, operational feasibility and benefit, and solicited input from the ATA FMS task force.	--	TBD		
1. FAA, in cooperation with users, must develop new procedures which use airplane RNAV capabilities to reduce congestion over waypoints. Such procedures should be expedited for the top 50 airports.	c. Explore modeling and analysis capabilities and establish analysis infrastructure using available capabilities for streamlining analysis.	--	TBD	The procedures currently in development have required no modeling. If it is determined at some point that modeling and site specific analysis is necessary, appropriate action will be initiated.	
1. FAA, in cooperation with users, must develop new procedures which use airplane RNAV capabilities to reduce congestion over waypoints. Such procedures should be expedited for the top 50 airports.	d. Site-by-site airspace analysis.	8/96	Each site to take 8-10 months.		

1. FAA, in cooperation with users, must develop new procedures which use airplane RNAV capabilities to reduce congestion over waypoints. Such procedures should be expedited for the top 50 airports.	e. Define criteria for off-airway minimum obstruction clearance altitude.	3/96	TBD	The off-airway minimum obstacle clearance altitudes are 1,000 feet except in designated mountainous terrain where it is 2,000 feet. The NOAA has been publishing an Off Route Obstruction Clearance Altitude (OROCA) on the IFR Low Altitude Charts in one degree grids for several years now. While this is a starting point, there are certain inefficiencies in allowing a single obstacle to dictate the minimum altitude in a 3,600 square mile grid. Further inhibiting use of the OROCA is the current requirement for ATC to radar monitor random RNAV routes. The principal RNAV system used at these altitudes would be GPS. Since GPS is still a "supplemental" system, the Flight Standards Service has been reluctant to approve random routes below radar coverage.	
1. FAA, in cooperation with users, must develop new procedures which use airplane RNAV capabilities to reduce congestion over waypoints. Such procedures should be expedited for the top 50 airports.	f. Develop RNP area navigation terminal area capacity enhancing procedures.	1/97	12/98	Another 3D RNAV approach has been commissioned at Charlotte-Douglas International airport (CLT) for runway 36L and GPS approaches have been approved for Minneapolis-St. Paul (MSP) and Newark (EWR). As with IAH, the approaches also have an RNP value on the approach plate and simultaneous approaches have been authorized. It is still the intent of ATO to make this a normal procedure and eliminate the need for like-kind waivers.	
FAA Office: AFS-410 ATO-100 Industry Lead: ATA	Point of Contact: Jim Enias Bill Moseley Point of Contact: Jack Ryan		Phone Phone	202-267-7208 202-267-7824 202-626-4025	

Notes: Area navigation (RNAV) as used in this action plan is a generic term used to describe a capability of navigation systems. The systems are divided into two: categories: ground based and non-ground based. Ground based refers to VOR/DME (thets/rho) and DME/DME (rho/rho). Non-ground based refers to GPS, LORAN, FMS, OMEGA, INS.

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2. Institute a process to quickly develop the standards, criteria, procedures, and training programs necessary to expand implementation procedures for use of area navigation equipment capabilities, including vertical guidance, to increase capacity and operating efficiency in terminal areas.	a. Established Advanced Flight Management Systems Applications Task Force to develop flight management system arrival and departure procedures.	2/91	Ongoing	The TF meets quarterly and provides a forum to discuss project progress and issues and to contribute to development of key technical documents. The TF meetings are always open to pilot/controller unions, aviation user groups and individuals.	Fully Funded
2. Institute a process to quickly develop the standards, criteria, procedures, and training programs necessary to expand implementation procedures for use of area navigation equipment capabilities, including vertical guidance, to increase capacity and operating efficiency in terminal areas.	b. Area navigation private approach conversation to public approaches.	1/97	12/98	As of 1/97 approximately 70 procedure have been developed by the Task Force. 5/97 --5 completed 17 -- formulated for action 50% complete -- 12/97 100% complete --12/98	
2. Institute a process to quickly develop the standards, criteria, procedures, and training programs necessary to expand implementation procedures for use of area navigation equipment capabilities, including vertical guidance, to increase capacity and operating efficiency in terminal areas.	c. Develop priority flight check listing and schedule for 50 locations. A list of the 50th busiest airports by passenger count and IFR operations were handed out to members of the Production WG in January 1997.	1/97	TBD	This initiative is closely related to item 2(d). This initiative is combined with 2(d) for tracking.	

2. Institute a process to quickly develop the standards, criteria, procedures, and training programs necessary to expand implementation procedures for use of area navigation equipment capabilities, including vertical guidance, to increase capacity and operating efficiency in terminal areas.	d. Determine, in collaboration with industry, priority listing of future area navigation approach requirements.	1/97	10/97	1. 4-requests submitted 3/97; members tasked to review and submit requirements for 50 busiest airports by 10/97. 2. Complete 2/97. 3. Complete 3/97.	
2. Institute a process to quickly develop the standards, criteria, procedures, and training programs necessary to expand implementation procedures for use of area navigation equipment capabilities, including vertical guidance, to increase capacity and operating efficiency in terminal areas.	e. Publish criteria for area navigation vertical guidance to create precision approaches.	6/96	TBD	1. Complete 6/96 2. Pending 3. Pending Order 8260340B (draft) being circulated for comments now has VNAV criteria.	
2. Institute a process to quickly develop the standards, criteria, procedures, and training programs necessary to expand implementation procedures for use of area navigation equipment capabilities, including vertical guidance, to increase capacity and operating efficiency in terminal areas.	f. Establish FMS/area navigation orientation programs for air traffic controllers. The syllabus should include information about the capabilities of current (and under development) aircraft including RNP, RTCA and VNAV capabilities, free flight concepts and transition to the future seamless global CNS/ATM system.	5/97	TBD	1. Pending 2. Pending 3. Pending 4. Pending	
FAA Office: AFS-410 ATO-100 Industry Lead: ATA	Point of Contact: Jim Enias Bill Mosely Point of Contact: Jack Ryan		Phone Phone	202-267-7208 202-267-7824 202-626-4025	

Notes: Does not include missed approaches that are covered as part of Recommendation 27.

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3. Review existing ATC procedures to identify changes for increased use of RNAV routes below FL180.	a. Aircraft equipment suffixes have been developed to allow pilots and controllers to identify and use new area navigation equipment.	--	Complete		
3. Review existing ATC procedures to identify changes for increased use of RNAV routes below FL180.	b. Air Traffic GPS Implementation working group formed to review existing and formulate new area navigation procedures.	--	Continuing Working Group	Air Traffic has created the Air Traffic Satellite Operational Implementation Team under Order 1110.126 to provide direction and oversight for the integration of satellite-based technologies. The team has met on an interim basis for the past six months pending publication of the Order. The first "official" meeting is scheduled for Dec. 98.	
3. Review existing ATC procedures to identify changes for increased use of RNAV routes below FL180.	c. Publish RNP requirements and implementation plan.	TBD	TBD	Air Traffic has written an Air Traffic SATNAV Implementation Plan that is in coordination; with expected publication by 1/99. This plan is the Air Traffic Service (ATS) overall strategy for the integration of a satellite-based navigation system into the air traffic control (ATC) environment. It summarizes ATS goals for SATNAV implementation in support of the FAA's national objectives, and it defines the roles and responsibilities of ATS organizations accountable for satellite navigation implementation. It summarizes on-going or required air traffic initiatives to meet the SATNAV goals of increased airspace and landing capacity, flexible use of airspace, and increased ground facility capacity and safety by phases of flight.	
3. Review existing ATC procedures to identify changes for increased use of RNAV routes below FL180.	d. Review of demonstrations of GPS, FMS, and RNP to identify basis for new/revised procedures.	6/96	Ongoing		

3. Review existing ATC procedures to identify changes for increased use of RNAV routes below FL180.	e. Identify and develop charted fuel efficient low altitude direct routes between city pairs, starting with DCA/BOS and SAN/SFO.	12/96	Ongoing	Work in progress with Atlantic Coast Airways to develop routes in the eastern U.S.96 routes have been developed within the Washington, New York and Boston Centers. 20 routes are scheduled for implementation on 12/20/98; with the remaining routes implemented in stages to be completed by 3/99. All HOST computers have been upgraded with system 2.1 which recognizes the E/F/G suffixes. In addition, Southern Region is working with ASA on direct routes proposed by that airline. Initial coordination has begun with the affected centers.	
FAA Office: ATO-402 Industry Lead: ATA	Point of Contact: Jeff Williams Point of Contact: Jack Ryan		Phone: Phone:	202-493-4679 202-626-4025	

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4. The planned expansion of the National Route Program (NRP) should be continued.	a. FAA Notice 7110.147, National Route Program, dated 12/20/95, has been revised to create a more aggressive expansion form.	--	4/96	Completed.	Fully Funded
4. The planned expansion of the National Route Program (NRP) should be continued.	b. Conduct ATC system impact analysis and modeling.	4/96	7/96	Completed by MITRE/CAASD.	
4. The planned expansion of the National Route Program (NRP) should be continued.	c. NRP expansion to FL 290.	--	10/96	Completed.	
4. The planned expansion of the National Route Program (NRP) should be continued.	d. Conduct post-expansion workload analysis to identify issues and lessons-learned from planned expansion to FL 290.	10/96	TBD	Database for tracking issues concerning NRP developed. Ongoing historical data collection.	
FAA Office: ATO-230 Industry Lead: ATA	Point of Contact: Elliot Reid Point of Contact: Jack Ryan		Phone: Phone:	703-904-4436 202-626-4025	

Rec #	Initiative	Start	Finish	Status	Funding Profile
5. Where appropriate, decrease 200 NM radius restriction for NRP filing.	a. Examine feasibility of reducing the 200 NM radius using existing modeling and analysis capabilities. Analysis should address issues such as workload and redesign of national airspace. • Initial simulation analysis • Additional simulation and Human in the Loop (HITL) analyses	8/96	Continuing	MITRE Corporation did some initial analysis on reduction of 200 NM restriction in increments of 50 NM at a time. The results were not especially useful because the modeling was designed to set a baseline and did not reflect realistic expectations of increased airline participation. Further consideration indicated this was not a realistic approach because: 1. The ingress/egress mileage would vary greatly from airport to airport, and 2. Programming of airline databases to account for airport variations would be cumbersome and time consuming. Development of the SID/STAR goal to allow users to file Standard Instrument Departure (SID) transitions to join an NRP route, and exit an NRP route via the transition of a Standard Terminal Arrival Route (STAR). • A notification under the provisions of the collective bargaining agreement was issued to NATCA on February 10, 1997. • On April 1, a committee consisting of NATCA, ATO-100/200, and the Airline Transport Association convened to outline the SID/STAR project and to provide national oversight. The National Business Aircraft Association and Regional Aircraft Association were invited to attend and will continue to be invited to participate on the committee.	
5. Where appropriate, decrease 200 NM radius restriction for NRP filing.	b. Develop procedures for use of standard instrument departures (SID's) and Standard Terminal Arrival Routes (STAR's) for filing a SID to the NRP to a STAR at destination	7/96			Fully Funded
5. Where appropriate, decrease 200 NM radius restriction for NRP filing.	c. Begin testing and evaluation of SID/STAR egress/ingress program at airport city pairs as agreed upon by FAA and industry working groups.	10/96	7/97		

5. Where appropriate, decrease 200 NM radius restriction for NRP filing.	d. Implement SID/STAR egress/ingress program nationally. Continued implementation of program to include additional cities beyond the initial list as agreed upon by FAA and industry user groups. Identify and disseminate ingress/egress points inside or outside 200 NM (those that do not have SIDs/STARs.)	3/98	TBD	• Regions and facilities will be tasked to review SID/STAR transitions to area airports to evaluate applicability to the SID/STAR goal. • Procedures for implementation of the SID/STAR program have been developed. and agreed upon by FAA and industry workgroup members. • Initial list of select cities has been developed consisting of 24 SID's and 11 STAR's. • Coordination with NATCA on implementation of initial cities list near completion. Airports that do not have SID/STAR routes are not likely to be the primary departure/destination points of the users. After the SID/STAR program is implemented at major sites, attention can be given to address those airports and determine a reasonable distance expectation for users to join a published route. (Published route indicating a jet or victor airway, as opposed to published preferred IFR route.)	
FAA Office: ATO-200 Industry Lead: ATA	Point of Contact: Elliot Reid Point of Contact: Jack Ryan		Phone: Phone:	703-904-4436 202-626-4025	

Note: Achievement of full user benefits potentially available through these initiatives requires timely and accurate publication of the SID/STAR egress/ingress points for inclusion in user fight planning capabilities. Progress on the NRP initiatives will be coordinated with International CAA's as appropriate.

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6. Develop mechanisms to provide predeparture feedback to the flight planners on potential impacts of requested flight plans, changes to requested flight plans, and systems constraints causing those changes.	a. RTCA Special Committee (SC) 169 Working Group 5 to define detailed and prioritized near and longer-term needs and benefits estimate, including requirements for a centralized data base identifying NAS status for flight planning.	10/98	10/99	Adequate resources have been allocated to develop the operational concept and detail a plan for prototype development/scope. The main thrust for the joint FAA/User overseeing this effort this year is to put in place a communications infrastructure which will support this capability on the future (see recommendation 14).	60% Funded
6. Develop mechanisms to provide predeparture feedback to the flight planners on potential impacts of requested flight plans, changes to requested flight plans, and systems constraints causing those changes.	b. FAA will identify, with industry, near-term procedural changes to increase information available on system constraints for flight planning, including GA requirement.	10/98	10/99		
6. Develop mechanisms to provide predeparture feedback to the flight planners on potential impacts of requested flight plans, changes to requested flight plans, and systems constraints causing those changes.	c. Working Group 5 will develop operational concept automated predeparture feedback and flight plan amendments for operations via direct interface between the Airline Operations Centers (AOC) and traffic management.				
6. Develop mechanisms to provide predeparture feedback to the flight planners on potential impacts of requested flight plans, changes to requested flight plans, and systems constraints causing those changes.	d. Define interface requirements between AOAS/DOTS.				
FAA Office: ASD-100 ATO-200 Industry Lead: RTCA SC169/WG-5	Point of Contact: Rich Fleagle Mark Libby Point of Contact: Rocky Stone		Phone: Phone:	202-358-5310 703-904-4400 719-282-0256	

Notes: This recommendation is linked to actions on recommendations 14 and 15.

Rec #	Initiative	Start	Finish	Status	Funding Profile
7. Implement rationing-by-schedule during Ground Delay Programs.	a. Continue TFM R&D associated work in the collaborative decision making area that will implement the rationing-by-schedule program.	--	TBD	Communications architecture (AOCNet) to facilitate the exchange of schedule information, system constraints and aggregate airport demand data, is scheduled to be implemented in April 1997. Joint FAA/User human in the loop simulations will follow, so to refine the operational procedures and verify development algorithms. The first airport scheduled for monitoring is SFO. (related recommendations: 8, 14, 15, 25) Early results show that using the GDP algorithms produced reductions in ground delays.	100%
7. Implement rationing-by-schedule during Ground Delay Programs.	b. Design and Implement a method for the airlines to experimentally communicate data on delays and cancellations to ETMS.	--	TBD		
7. Implement rationing-by-schedule during Ground Delay Programs.	c. Modify test bed to experimentally incorporate information on cancellation and delays.		TBD		
7. Implement rationing-by-schedule during Ground Delay Programs.	d. Operational trials (off-line and operational testing).	10/96	3/97		
7. Implement rationing-by-schedule during Ground Delay Programs.	e. Decision to implement.	3/97	3/97		
7. Implement rationing-by-schedule during Ground Delay Programs.	f. Daily use operational prototype available.	3/97	9/98		
FAA Office: ASD-100 ATO-200 Industry Lead: RTCA SC169/WG-5	Point of Contact: Rich Fleagle Mark Libby Point of Contact: Rocky Stone		Phone: Phone:	202-358-5310 703-904-4400 719-282-0256	

Note: Airlines will need to modify their system software. The same team working 8, 14, 15, and 25 will perform these actions.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
8. Establish more flexible ground delay program procedures and supporting decision support systems (DSS).	a. The CDM work group will develop the ground rules and test bed capabilities for schedule compression and control by required arrival time.	--	8/96	Ongoing efforts through the CDM Work Group and follow on RTCA SC-191 activities have provided input and guidance for concept development activities for DSSs. Initial GDP flexibility and DSSs are being implemented along with the CDM Operational Prototype.	Prototype Development (RE&D), F&E) 100%
8. Establish more flexible ground delay program procedures and supporting decision support systems (DSS).	b. Implement ground rules for communications between ATCSCC and the AOC's.	--	8/96		
8. Establish more flexible ground delay program procedures and supporting decision support systems (DSS).	c. Collaborative decision making working group identifies communications improvements required and recommends DSS changes to ETMS.	--	3/97		
8. Establish more flexible ground delay program procedures and supporting decision support systems (DSS).	d. Implement DSS changes.	--	ongoing		
8. Establish more flexible ground delay program procedures and supporting decision support systems (DSS).	e. Users to implement changes in their operational systems to provide updated schedule and flight cancellation information and other changes necessary to operate with the new procedures.	--	ongoing		
FAA Office: AOZ Industry Lead: ATA	Point of Contact: Bob Voss Point of Contact: Jack Ryan		Phone: Phone:	202-493-0385 202-626-4025	

Note: The same team working on recommendations 7, 14, 15, and 25 will perform these actions.

Rec #	Initiative	Start	Finish	Status	Funding Profile
9. Establish a coordinated effort among military, FAA, and NAS users to define the information and capabilities necessary to improve civil use of SUAs when not being utilized by DOD.	a. Establish working group of military, FAA, other government agencies, NATCA; and users to determine specific information requirements concerning SUA availability and time frames for notification of availability.	8/96	3/98	Additional activities/site visits the SUA work group has been involved with: Delta Airlines Operations Center (AOC), American Airlines AOC, Jacksonville Air Route Traffic Control Center (ARTCC), Fort Worth ARTCC, Jacksonville Fleet Area Control and Surveillance Facility, Fort Worth Joint Reserve Base, White Sands Missile Range, USS John C. Stennis aircraft carrier, Gainesville Automated Flight Service Station (AFSS), Fort Worth AFSS, Gulf of Mexico Users Meeting, and the Government/Industry Aeronautical Charting Forum.	
9. Establish a coordinated effort among military, FAA, and NAS users to define the information and capabilities necessary to improve civil use of SUAs when not being utilized by DOD.	b. Implement FAA system of tracking SUA availability (SAMS).	8/97	1/98	SAMS has been installed at all Air Route Traffic Control Centers, Honolulu and San Juan Combined Center-RAPCONs, Fayetteville, High Desert , and Pensacola TRACONs, and Fort Worth Automated Flight Service Station.	
9. Establish a coordinated effort among military, FAA, and NAS users to define the information and capabilities necessary to improve civil use of SUAs when not being utilized by DOD.	c. FAA will develop rules and procedures to support identified requirements for supporting improved civil access to SUA.	8/96	TBD	The procedures to disseminate SUA schedules developed in Action Item 10a have been replicated at Jacksonville ARTCC and New York ARTCC for warning area information, and Albuquerque ARTCC for White Sands Missile Range information. The Industry/Government Aeronautical Charting Forum is reviewing the work group' s request to chart frequencies for SUA information on aeronautical charts used by general aviation pilots, and to display Air Traffic Control Assigned Airspace on pertinent aeronautical charts. The FAA continues to work with ATA-400 and NFDC to chart ATCAAs.	

9. Establish a coordinated effort among military, FAA, and NAS users to define the information and capabilities necessary to improve civil use of SUAs when not being utilized by DOD.	d. DOD SUA scheduling system to provide electronic schedules to FAA systems by 1998.	8/98	6/99	Negotiations are on-going between the FAA and DOD; tentative initial operating capability is August 1998. MAMS has sent test schedules to SAMS which can be initiated at a SAMS terminal.	
9. Establish a coordinated effort among military, FAA, and NAS users to define the information and capabilities necessary to improve civil use of SUAs when not being utilized by DOD.	e. Define and implement interface between SAMS and ETMS/NOTAMS/other systems to allow for transfer of SUA information to users.	7/96	12/99	Remaining software development requirements include, but are not limited to, analysis reports and interfaces with Enhanced Traffic Management System, Military Airspace Management System and distribution of the data to Flight Service Stations. ADTN2000 was selected as the telecommunications network for the SAMS V3.0 system. Installation of the network began in September 1996. Currently there are six sites remaining that are waiting connectivity or line installation. In addition, Internet Protocol (IP) addresses have not been tested which provide connectivity to the main server site at the Air Traffic Control System Command Center (ATCSCC) and the other sites. SAMS equipment is installed at all of the Centers, two CERAPS , and three tower facilities;. The main server at ATCSCC is operational and capable of doing airspace analysis reports. SAMS is currently transitioning from ADTN2000 to NADIN II to increase transmission speed, security and provide access to other NAS equipment systems.	

9. Establish a coordinated effort among military, FAA, and NAS users to define the information and capabilities necessary to improve civil use of SUAs when not being utilized by DOD.	f. FAA will compare available capabilities with identified requirements to determine if additional infrastructure development (e.g., air/ground communication) is required. Cost/benefit of additional development will be assessed.			Free Flight working group was formed to address real time special use airspace management as it applies to free flight. The group consists of representatives from the FAA, commercial aviation, general aviation, DOD, DOI, and NATCA. The following points have been made: (1) DOD policy of returning SUA back to the controlling agency (FAA) when not in use is considered fundamentally sound and supported by all concerned. The implementation of this policy was observed at Edwards AFB. (2) Non-DOD NAS users (commercial and general aviation) reiterated that they seek access to SUA when that airspace is not in use. (3) Non-DOD NAS users understand that their request to gain access to SUA, when that airspace is inactive, requires coordination and approval through the FAA. (4) DOD requires flexible scheduling to accomplish its mission. Rigid scheduling requirements would not accommodate the many variables that could affect the mission, i.e., weather, telemetry/instrumentation aircraft availability, etc. (5) Non-DOD NAS users indicated that they require SUA status information from the FAA as soon as the FAA knows it. This includes air traffic control assigned airspace (ATCAAs) and their charting. (6) Information dissemination to non-DOD NAS users, by the FAA, appears to be major issue where most follow-on action must be focused. SAMS project is working with other organization (eg. FFP1 Program Office) to provide airspace data for possible conflict probe use.	

9. Establish a coordinated effort among military, FAA, and NAS users to define the information and capabilities necessary to improve civil use of SUAs when not being utilized by DOD.	g. Establish a measurement capability to track SUA volume, utilization, and management.	9/96	TBD	Free Flight working group was formed to address real time special use airspace management as it applies to free flight. The group consists of representatives from FAA, commercial aviation, general aviation, DOD, DOI, and NATCA. The following points have been made: (1) DOD policy of returning SUA back to the controlling agency (FAA) when not in use is considered fundamentally sound and supported by all concerned. The implementation of this policy was observed at Edwards AFB. (2) Non-DOD NAS users (commercial and general aviation) reiterated that they seek access to SUA when that airspace is not in use. (3) Non-DOD NAS users understand that their request to gain access to SUA, when that airspace is inactive, requires coordination and approval through the FAA. (4) DOD requires flexible scheduling to accomplish its mission. Rigid scheduling requirements would not accommodate the many variables that could affect the mission, i.e., weather, telemetry/instrumentation aircraft availability, etc. (5) Non-DOD NAS users indicated that they require SUA status information from the FAA as soon as the FAA knows it. This includes air traffic control assigned airspace (ATCAAs) and their charting. (6) Information dissemination to non-DOD NAS users, by the FAA, appears to be major issue where most follow-on action must be focused. The main server at ATCSCC is operational and capable of doing airspace analysis reports. SAMS is currently transitioning from ADTN2000 to NDIN II to increase transmission speed, security and provide access to other NAS equipment systems.	
FAA Office: AOZ ASD-100 Industry Lead: ATA	Point of Contact: Steve Alvania Rich Fleagle Point of Contact: Jack Ryan		Phone: Phone:	202-493-0373 202-493-0428 202-626-4025	

Note: Recommendation is linked to recommendations 10 and 11.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
10. An operational trial in one or more SUA should be conducted to demonstrate how improved information exchange on the status of SUA can improve civil use of SUAs when not being utilized by DOD.	a. Technical working group (formed in Rec. 9a) identifies one or more SUA's for operational trials of data sharing with existing capabilities.	8/96	8/98	The working group recommended an operational trial at the R-508 Complex (Edwards AFB). SUA information was disseminated by Oakland ARTCC via the ETMS mail system to air carriers with no disruption to DOD operations. The trial was conducted in February and March 1997 and required the cooperation and coordination of the FAA Western-Pacific Region Air Traffic, the R-2508 Complex Control Board, Oakland ARTCC, High Desert TRACON, Los Angeles ARTCC, and the user community. A second trial commenced on December 20, 1997 between New York Metropolitan (JFK,LGA, EWR) airports and Orlando International Airport. Aircraft are being routed offshore and transitioned, if feasible, through the warning areas on a "real-time" basis.	
10. An operational trial in one or more SUA should be conducted to demonstrate how improved information exchange on the status of SUA can improve civil use of SUAs when not being utilized by DOD.	b. Identify FAA and DOD lead for this effort, and identify priority status of this effort.	6/96	8/96	Completed	
10. An operational trial in one or more SUA should be conducted to demonstrate how improved information exchange on the status of SUA can improve civil use of SUAs when not being utilized by DOD.	c. FAA and DOD collect benefits and operational issues during trials.	2/97	8/98	FAA/DOD and other users collected information during the operational trial at the R-2508 Complex. One airline stated it was saving $30,000 per month based on fuel loading decisions for the s trial, while there was no impact to DOD operations. The procedure was implemented on a permanent basis at the R-2508 Complex. The collection of data is still on-going for the Orlando International Airport trial.	

10. An operational trial in one or more SUA should be conducted to demonstrate how improved information exchange on the status of SUA can improve civil use of SUAs when not being utilized by DOD.	d. Results (costs and benefits) of operational trial will be fed into procedure and infrastructure development activities in Rec. 9.	2/97	8/98	The procedures for the R-2508 Complex were implemented at Jacksonville and New York ARTCCs for warning area information, and at Albuquerque ARTCC for the White Sands Complex of SUA. Data collection is still on-going for the Jacksonville trial	
10. An operational trial in one or more SUA should be conducted to demonstrate how improved information exchange on the status of SUA can improve civil use of SUAs when not being utilized by DOD.	e. FAA/DOD agreement on national procedures.			The following points were made: (1) The R-2508 complex dynamically accommodates civil in-flight requests for flight within the R-2508 airspace. (2) Information sharing between DOD and FAA in R-2508 complex is accomplished very efficiency through a variety of electronic information exchanges, as well as, being physically collocated in the TRACON facility. (3) Information sharing between FAA and Non-DOD NAS users normally occurred on a tactical, real time basis. (4) Filing and approval of more preferred routing through R-2508 in a southeast direction, i.e., J-110, with Oakland Center has been a problem for the airlines. Filing and approval of more preferred routing in the northwest direction through R-2508 via J-110 had not been a problem. (5) Each participant is tasked to compile a list of SUAs. Which they believe would be a candidate for another operational trial. Another on-site visit has been scheduled tentatively for the North Florida area. (6) The operational trial at the R-2508 complex will be incorporated into standard operating procedures. (7) An attempt will be made to transfer this strategy to provide air carriers with R-5107 F&G information availability.	
FAA Office: AOZ Industry Lead: ATA	Point of Contact: Steve Alvania Point of Contact: Jack Ryan		Phone: Phone:	202-493-0373 202-626-4025	

Note: The DOD has offered Holloman (White Sands) and Edwards (R2508) airspace for trails. For low-altitude direct routing around and through SUA, see Recommendation 29. This recommendation is linked to recommendations 9 and 10.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
11. Develop and implement real time SUA notification between DOD and FAA, and between FAA and flight planners. A program plan is needed in the near term.	a. The joint team (formed in Rec. 9a) will assess the need for real-time SUA notifications and will develop a program plan to reflect needed changes in systems, procedures, and training to implement real-time exchange of schedule information.	8/96	TBD	The work group in Rec. 9 wanted the FAA to provide the information they have to users, as the information is received by the FAA.	
11. Develop and implement real time SUA notification between DOD and FAA, and between FAA and flight planners. A program plan is needed in the near term.	b. Examine needed internal and external FAA infrastructure changes to enable real-time SUA notification, such as an interface between SAMS and the Host.	TBD	TBD	The Host Replacement Mission Need Statement has been approved by the FAA. The entry and display of SUA information will be available to the air traffic controller.	
FAA Office: AOZ Industry Lead: ATA DOD Lead:	Point of Contact: Steve Alvania Point of Contact: Jack Ryan Point of Contact: Lt. Col. Paul Ewing		Phone: Phone Phone::	202-493-0373 202-626-4025 617-238-7901	

Note: Recommendation is linked to recommendations 10 and 11.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
12. Streamline the FAA certification process to reduce time and costs for approval and fielding to new and emerging technologies.	a. Briefing to Free Flight Steering Committee on status of Challenge 2000, with emphasis on implications for free flight.	6/96	6/97	This initiative is complete and no further action or reporting is necessary	

12. Streamline the FAA certification process to reduce time and costs for approval and fielding to new and emerging technologies.	b. RTCA to be used to develop consensus standards for avionics, and NAS ground components. Initial activities will focus on the definition/development of software standards for NAS ground systems.			Report on streamlining certification completed in June 1997. FAA contact: Tom Kraft. RTCA SC-189/EUROCAE WG-53, operational environment and system, schedule for completion in December 1998, milestone schedule is available from SC-189/WG-53 leadership. FAA Contact: Tom Kraft. RTCA SC-190/EUROCAE WG-52, S/W, schedule is available from the leadership of SC-190/WG-52. FAA Contact: Mike DeWalt. RTCA SC-180/EUROCAE WG-46, H/W, schedule is available from the leadership of SC-180/WG-46. FAA Contact: Connie Beane. SAE ARP 4754, development assurance for aircraft systems, completed 12/96. FAA Contact: Jim Tracy. SAE ARP 4761, safety assessment methods for aircraft systems, completed 12/96. FAA Contact Jim Treacy. ARAC Systems Design & Analysis Harmonization Working Group (SDAHWG) is revising AC 25 1309.1A to recognize SAE ARP 4754 and SAE ARP 4761. A schedule is available from the leadership of ARAC SDAHWG. FAA Contact Steve Paasch. Need to establish FAA policies and guidelines to use RTCA documents of RTCA	

				SC-189/EUROCAE WG-53 and RTCA SC-190/EUROCAE WG-52 for definition of operational environments, safety assessments, development assurance, operational concepts, Mission Needs, Operational requirements Documents, NAS specifications. A certification authority advisory group for SC-189 is planned to develop these policies…meeting in Feb. 98 and will meet again in Brighton, England with CAA advising group. The CAA meeting will take place in Brighton in June '98. The FAA Administrator has asked that other CAA groups participate. A paper was provided to the ICAO Conference on Global Safety Oversight in Nov. '97. Presently coordinating another presentation at the ICAO Rio meeting on CS/ATM in May.	
12. Streamline the FAA certification process to reduce time and costs for approval and fielding of new and emerging technologies.	c. Define an interactive communications process between the FAA and the Special Groups and provide a regular forum through the RTCA Technical Management Group for dealing with consensus issues relating to certification.	5/96	8/96	Special Groups interactively and effectively communicate with the FAA through the RTCA Executive Board and the RTCA Technical Management Committee (TMC). The Associate Administrator of Regulation and Certification serves on the executive Board and the Manager of the Aircraft Engineering Division, AIR 100, under the Aircraft Certification Service, serves on the RTCA TMC. **This initiative is complete and no further action or reporting is necessary.**	

12. Streamline the FAA certification process to reduce time and costs for approval and fielding to new and emerging technologies.	d. Develop and implement a mechanism for FAA to facilitate the certification process.	1997	1998	The FAA recognizes RTCA under the Federal Advisory Committee Act to facilitate the certification process. RTCA provides a forum for the FAA to collaborate with industry and Special Groups through the use of RTCA special committees to develop guidance material for certification in the form of Minimum Operational Performance Standards (MOPS) and Minimum Aviation System Performance Standards (MASPS), The special committees operate under the direction of the TMC. FAA Contact: Jim Williams The FAA also recognizes the ARAC, under the Federal Advisory Committee Act, and SAE to facilitate the certification process through industry involvement in the FAA's rulemaking process. **This initiative is complete and no further action or reporting is necessary.** In addition AOA has asked RTCA to form a Task Force 4 to make specific recommendations on areas for improvements. Further actions under this item will be tracked under resolutions as part of the task force activity.	
FAA Office: ASD-100 Industry Lead: AOPA	Point of Contact: Mike Harrison Point of Contact: Doug Helton		Phone: Phone:	202-358-5271 301-695-2213	

Note: Avionics Systems Branch, AIR-130, formed to address new and emerging avionics technologies, representatives from both this branch and the System Architecture and Integration Program Directorate, ASD-100, serve on the RTCA Technical Management Committee.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
13a. In collaboration with NAS users, the FAA should make a decision on the initial air/ground data link to be implemented for domestic ATC communications, navigation, and emerging technologies.	a. FAA convenes joint FAA/industry meeting providing FAA's communications data link alternatives, timing, and recommendations for air traffic services on data links for oceanic and domestic services (including Mode S and VHF).	--	TBD	The NAS Architecture describes the FAA's plans and projected schedules for Mode S and VHF data link. This document is being updated to reflect current input from the Task Force on Modernization and should be completed by July 98.	Fully Funded
13a. In collaboration with NAS users, the FAA should make a decision on the initial air/ground data link to be implemented for domestic ATC communications, navigation, and emerging technologies.	b. Free Flight Steering Committee must, using available data, reach agreement on technical solutions, comparing benefits (near-and mid term) with estimates on user equipage timing.	7/96	TBD	AVR has coordinated the certification requirements for CPDLC Build 1 testing with NWA and the program office. FAA Administrator has asked John Kern of Northwest Airlines to work data link issues in collaboration with NAS users.	Fully Funded
13a. In collaboration with NAS users, the FAA should make a decision on the initial air/ground data link to be implemented for domestic ATC communications, navigation, and emerging technologies.	c. Air Traffic Services via data link identified with transition road map in Version 2.0 of NAS Architecture.	--	Complete	The draft Architecture v3.0 is being updated to include recommendations from the Task Force on Modernization. The data link transition is expected in the revised v3.0.	
13a. In collaboration with NAS users, the FAA should make a decision on the initial air/ground data link to be implemented for domestic ATC communications, navigation, and emerging technologies.	d. Data link guidelines for the cockpit (SAE G-10/ATA/RTCA Human Factors Data Link Group).	--	TBD	Safe Flight 21efforts related to data link guidelines are also applicable to the Free Flight recommendations. The issues being investigated include: - Determination of optimal display surface for cockpit display of traffic information (CDTI), weather, terrain data, and navigation information -Technology, procedures, and workload issues related to CDTI, use of integrated traffic and surface maps, and ADS-B - Aircraft access to current SUA schedule and status, including display. Examination of controller/pilot interaction (intelligent agents) to accommodate user preferred trajectories, schedule, and flight sequencing. -Evaluation of displays for weather information in alternate graphic and textual formats.	Funded

13a. In collaboration with NAS users, the FAA should make a decision on the initial air/ground data link to be implemented for domestic ATC communications, navigation, and emerging technologies.	e. Complete ICAO SARPS analysis of TDMA standards for VHF.				
13a. In collaboration with NAS users, the FAA should make a decision on the initial air/ground data link to be implemented for domestic ATC communications, navigation, and emerging technologies.	f. FAA ATN subnet performance assessment.		10/97	The FAA is working with ARINC for modeling VDL Mode 2 and MITRE for modeling of VDL Mode 3. Refer to Initiative h for additional information.	Funded
13a. In collaboration with NAS users, the FAA should make a decision on the initial air/ground data link to be implemented for domestic ATC communications, navigation, and emerging technologies.	g. Architecture issue resolution: Communications requirements for commissioning/decommissioning of current analog systems.	7/96	TBD	Decommissioning issues and schedules will be addressed in NAS Architecture 98.	Fully Funded
13a. In collaboration with NAS users, the FAA should make a decision on the initial air/ground data link to be implemented for domestic ATC communications, navigation, and emerging technologies.	h. FAA/ARINC/MITRE Cooperative Research and Development Agreement (CRDA) activity simulating VDL Mode 2 performance and capacity.		TBD	VDL Mode 2 has been modeled using scenarios in the airports, en route, and terminal domains, using both AOC and ATC traffic to predict the number of aircraft that can b supported.	Fully Funded
13a. In collaboration with NAS users, the FAA should make a decision on the initial air/ground data link to be implemented for domestic ATC communications, navigation, and emerging technologies.	i. ARINC VDL Mode 2 prototype test.		10/96	Tests were completed in August 1996. In addition to the ARINC work, GE Marconi conducted tests in Europe that demonstrated effective ranges of 250 NM with a bit error rate (BER) of 10-3. Data from the tests were used by the ICAO AMCP in the validation of the SARPs. **CLOSED**	Fully Funded
13a. In collaboration with NAS users, the FAA should make a decision on the initial air/ground data link to be implemented for domestic ATC communications, navigation, and emerging technologies.	j. Implement strategic communications services using existing ACARS and current ATC infrastructure at the FAATC, followed by installation at key sites to be identified collaboratively with the users.	10/96	4/98	Data Link implementation plan will use Architecture 98.	

13a. In collaboration with NAS users, the FAA should make a decision on the initial air/ground data link to be implemented for domestic ATC communications, navigation, and emerging technologies.	k. Implement tactical communications services in appropriate terminal and en route domains using existing ACARS and current ATC infrastructure at the FAATC, followed by installation at key sites.	10/96	4/98	ACARS unacceptable for tactical communications: VDL Mode 2 will support ATC to the extent certified by Air Traffic Requirements. **CLOSED**	
FAA Office: ASD-100 AND-470 AIR-100 Industry Lead: AOPA	Point of Contact: Mike Harrison Richard Lay Bruce DeClene Point of Contact: Doug Helton		Phone: Phone:	202-358-5271 202-267-7768 202-267-9897 301-695-2213	

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
13b. The FAA should collaborate with the airspace users in the continued development of oceanic data link (i.e., SATCOM, HF data link).	a. Identify, through ICAO, standards for use of HF data link.	5/96	TBD	AEC documents for HF are complete; ARINC, Collins, and AlliedSignal are building avionics conforming to the AEEC specifications. RTCA SC 189 is addressing RCP. MASPS and MOPS are also developed. The ground test station is completed; avionics testing will begin soon.	
13b. The FAA should collaborate with the airspace users in the continued development of oceanic data link (i.e., SATCOM, HF data link).	b. Clarification of roles and responsibilities for the cost of data link services.		TBD	Legal issues and political ramifications remain to be explored, linked to overall effort to recoup operational costs through use fees.	
13b. The FAA should collaborate with the airspace users in the continued development of oceanic data link (i.e., SATCOM, HF data link).	c. Assess impact of MEO/LEO applications on oceanic communications.		TBD	No activity based on lack of funding.	Not Funded
13b. The FAA should collaborate with the airspace users in the continued development of oceanic data link (i.e., SATCOM, HF data link).	d. Free Flight Steering Committee members shall develop benefits, transition strategy, and estimates of airline equipage and make recommendations to the FAA on airline commitment to invest in ATN protocols in oceanic airspace.			The Free Flight Select Committee was formed to explore these and other issues.	
FAA Office: ASD-100 AIR-100 Industry Lead: AOPA	Point of Contact: Mike Harrison Bruce DeClene Point of Contact: Doug Helton		Phone: Phone:	202-358-5271 202-267-9897 301-695-2213	

Rec #	Initiative	Start	Finish	Status	Funding Profile
14. Improve telecommunications mechanisms to enhance the free flow of information between users and the Traffic Flow Management (TFM) system on a machine to machine basis.	a. Prototype/test communications link and DSS between ATCSCC and AOC's.		5/97	AOCNet operational as of 7/97. FY '98 will require additional, but not substantial, funding to gain connectivity to all needed NAS facilities and ADTN 2000.	TBD
14. Improve telecommunications mechanisms to enhance the free flow of information between users and the Traffic Flow Management (TFM) system on a machine to machine basis.	b. Determine operational requirements for the information exchange. Utilize current activities of RTCA SC 169 WG5 to complete this effort.		10/97		TBD
14. Improve telecommunications mechanisms to enhance the free flow of information between users and the Traffic Flow Management (TFM) system on a machine to machine basis.	c. Investigate alternative telecommunications infrastructures (e.g., ATN, NADIN and ARINC, Internet).		9/98		TBD
FAA Office: ATO-200 ASD-100 Industry Lead: RTCA SC-165/WG-5	Point of Contact: Gil Armbruster Rich Fleagle Point of Contact: Rocky Stone		Phone: Phone:	703-904-4400 202-358-5310 719-282-0256	

Note: The same team working on recommendations 7, 8, 15, and 25 will perform these actions.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
15. Incorporate airline schedule updates (e.g., company delays and cancellations) in FAA decision support systems and decision processes.	a. Implement prototype enhanced FAA/industry data exchange capability to include operational schedules.	8/96	5/97	Flight Plan Substitution is a component of CDM package #2. Package #2 will begin during FY-99	
15. Incorporate airline schedule updates (e.g., company delays and cancellations) in FAA decision support systems and decision processes.	b. Design and implement a method for airlines to communicate substitution messages to ETMS.	8/96	Ongoing		
15. Incorporate airline schedule updates (e.g., company delays and cancellations) in FAA decision support systems and decision processes.	c. Provide flight schedule monitor with the input to process the improved substitution messages.	8/96	Ongoing		
15. Incorporate airline schedule updates (e.g., company delays and cancellations) in FAA decision support systems and decision processes.	d. Evaluate and test methodology for transfer of arrival slots between airlines.	8/96	Ongoing		
FAA Office: AOZ Industry Lead: ATA	Point of Contact: Bob Voss Point of Contact: Jack Ryan		Phone: Phone:	202-493-0385 202-626-4025	

Note: The same team working on recommendations 7, 8, 15, and 25 will perform these actions.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
16. Enhance, if possible, or replace the current ATM monitor/alert function, including, but not limited to, a means of measuring controller workload and complexity.	a. Identify deficiencies and their causes in the present monitor alert functionality.	1996	1997	Deficiencies were identified and near term fixes were implemented in the areas of flight time modeling and flight path modeling. These fixes were implemented on 8/19/96. Other fixes were planned for implementation in the May 1997 time frame. Long-term improvements will require re-engineering in the area of Flight Time Modeling and Event List Processing.	Fully Funded
16. Enhance, if possible, or replace the current ATM monitor/alert function, including, but not limited to, a means of measuring controller workload and complexity.	b. FAA labor/management team and users shall review monitor alert performance and recommend criteria for evaluating workload and airspace complexity modeling.	1999	1999	This effort will begin when the accuracy of monitor alert is attained through the planned fixes. Preliminary studies have been done. This is targeted for the 1999 time frame.	Not Fully Funded
16. Enhance, if possible, or replace the current ATM monitor/alert function, including, but not limited to, a means of measuring controller workload and complexity.	c. Improve the monitor/alert function by incorporating updated sector boundary and configuration data and trajectory processing.	1997	1997	Modifications were made to the process for incorporating sector "shelving" to model the three dimensional representation of a sector. Modifications were made to correct problems with flight trajectories and improvements were made in removing the ambiguity of determining the sector to which a flight will be assigned. To correct problems with flight trajectories, the aircraft descent profile was flattened by changing the initial glideslope and adjusting the altitude of the leveling plateau.	Not Fully Funded
FAA Office: ATO-200 AOZ Industry Lead: ATA NATCA	Point of Contact: Gil Armbruster Delois Smith Point of Contact: Jack Ryan Mike Conner		Phone: Phone:	703-904-4400 202-233-5038 202-262-4025 202-223-2900	

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Rec #	Initiative	Start	Finish	Status	Funding Profile
17. Expedite the deployment of digital ATIS, automated taxi clearance and expanded use of a standard taxi clearance as appended to the PDC. Expedite expansion of PDC to additional 27 sites. Evaluate expansion beyond the planned 57.	a. Deliver all 57 tower data link sites for PDC and D-ATIS.		3/98	PDC is operational at all 57 sites. D-ATIS is operational at 49 sites and the other 8 are awaiting D-ATIS local refresher training completion, expect D-ATIS operation at remaining sites by 5/98.	Fully Funded
17. Expedite the deployment of digital ATIS, automated taxi clearance and expanded use of a standard taxi clearance as appended to the PDC. Expedite expansion of PDC to additional 27 sites. Evaluate expansion beyond the planned 57.	b. Complete Detroit demonstration of taxi route delivery.	1/98	6/98	Four month demonstration underway and will be followed by a one (1) month evaluation, expected to be completed by 6/98.	Fully Funded
17. Expedite the deployment of digital ATIS, automated taxi clearance and expanded use of a standard taxi clearance as appended to the PDC. Expedite expansion of PDC to additional 27 sites. Evaluate expansion beyond the planned 57.	c. Publish charted standard taxi routes for national implementation.	4/96	4/96	The activity is postponed until benefits have been assessed based on the results of the Detroit demonstrations.	Not Funded
17. Expedite the deployment of digital ATIS, automated taxi clearance and expanded use of a standard taxi clearance as appended to the PDC. Expedite expansion of PDC to additional 27 sites. Evaluate expansion beyond the planned 57.	d. Free Flight Steering Committee identifies additional sites for tower data link services, conducts benefit/cost analyses, and makes recommendations to the FAA.	6/96	12/96	No candidate sites for expansion have been identified.	Not Funded
17. Expedite the deployment of digital ATIS, automated taxi clearance and expanded use of a standard taxi clearance as appended to the PDC. Expedite expansion of PDC to additional 27 sites. Evaluate expansion beyond the planned 57.	e. Notify Free Flight Steering Committee on decision for additional sites.	10/96	1/97	No candidate sites for expansion have been identified.	Not Funded

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FAA Office: AND-600	Point of Contact: Larry Stotts		Phone:	202-358-5033	
Industry Lead: ATA	Point of Contact: Joe Dorfler		Phone:	202-626-4010	
Northwest	Duane Edelman			612-726-7744	
NBAA	Paul Smith			202-783-9000	

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Rec #	Initiative	Start	Finish	Status	Funding Profile
18. FAA should initiate the development of the standards for a cockpit situational awareness display of traffic information.	a. Working with the industry, a joint FAA/NASA team shall develop the CDTI operational concept. • EAA Demos in Lakeland, FL and Fullerton, CA • AGATE demos in Atlanta		2/98 • 1997 • 1998	RTCA published CDTI Interim Guidance 2/98 as DO-243. Includes ops concept. Conducted during Olympics (was FAA demo, not AGATE) Safe Flight 21 will provide operational evaluation of CDTI. Items to be evaluated include: • Position reports for all pertinent aircraft retransmitted from TIS back to the cockpit • Use of ADS-B and DCTI to provide traffic and/or conflict information to the pilot • Use of TIS or TIS-B to enhance the traffic information to the pilot	Cockpit Display of Traffic Information (CDTI) is funded under the umbrella of ADS-B
18. FAA should initiate the development of the standards for a cockpit situational awareness display of traffic information.	b. Identify certification issues and concerns.	6/98	TBD	Ongoing	
18. FAA should initiate the development of the standards for a cockpit situational awareness display of traffic information.	c. RTCA SC 186/WG3 to develop MOPS.		TBD	RTCA has initiated a working group (WG-3) under SC-186 on ADS-B to develop standards (MOPS) for CDTI. WG-3 has published Interim guidance and is developing full CDTI MOPS.	
18. FAA should initiate the development of the standards for a cockpit situational awareness display of traffic information.	d. Complete benefit/cost analysis of CDTI.	1/99	TBD	Not done. No funding available until FY-99.	

18. FAA should initiate the development of the standards for a cockpit situational awareness display of traffic information.	e. Identify criteria for study graphical cockpit display of traffic information.		1997	Completed	
18. FAA should initiate the development of the standards for a cockpit situational awareness display of traffic information.	f. Identify criteria for on integration of terrain, traffic, and weather components.		6/99	SAE-G10 (human factors) doing limited work in this area.	
18. FAA should initiate the development of the standards for a cockpit situational awareness display of traffic information.	g. Flight test of air-to-air simulated safety encounters, identifying limitations of CDTI in supporting air-to-air separation.	10/98	TBD	This is Safe Flight 21 work being planned with the Cargo Airline CRDA.	Funded
FAA Office: AND-470 AIR-130 Industry Lead: RTCA SC-186/WG-3	Point of Contact: Richard Lay Bruce DeClene Point of Contact: Debbie Kirkman Ed Briggs		Phone: Phone:	202-267-7768 202-267-8049 703-883-5964 404-715-1640	

Notes: Information flows between the ground and aircraft must be defined to determine changes in communications and automation architectures after minimum operational requirements are defined. Whether the information can be used for self-separation or only to improve flexibility and awareness must be answered through simulation and fight test. AEEC and/or SAE must play a role in development of CDTI engineering standards.

Rec. #	Initiative	Start	Finish	Status	Funding Profile
19. Deploy a ground-based conflict probe in the near term to accelerate the selection and development of a conflict probe with automated planning aids to assist controllers in the identification and resolution of conflicts.	a. Deploy mature components of present conflict probe and automated planning research at selected field facilities for concept development and evaluation. (Move from Lab to field evaluation). Efforts underway which may lead to operationally deployable capabilities include: URET at ZID PRAT at ZBW UPR at ZDV Free Flight Evaluation Work Station at ZKC.	4/96	3/98	The evaluation of the PRAT system at ZBW was completed in September 1996. PRAT is viewed as a source of potential requirements for the follow-on ICP capability. Issues associated with proprietary software handicapped a full evaluation of the PRAT. The field evaluation of the URET operational prototype system began in February 1998 at ZID, and is still in progress. Daily use (eight hours per day, dive days per week) of URET began at ZID in September 1997 and at ZME in November 1997 using the baseline software version D2.1. Evaluation of the Interfacility Automation (IFA) version D3.0 began in October 1997, between ZID and ZME. Based on the URET evaluations done to date, Evaluation Reports, preliminary Systems Specification, and algorithmic definition documents for key algorithmic areas have been developed. A URET Technology Transfer process from MITRE/CAASD to the FAA and its development contractors for DSR ICP was completed in late 1997. A MITRE Technical Assessment Report positively assessed the URET operational concept and also identified the need for substantial re-architecture and re-coding of the software for full scale DSR ICP development. URET is presently regarded as a source of requirements and algorithms for both the ICP and FCP. An initial field trial of the UPR Transition Airspace Tool was conducted as a research activity at ZDV in September 1996. Simulations using the UPR Transition Airspace Tool with controllers were conducted in 11/96. A “shadow mode” (office area) version of the UPR Transition Airpspace Tool was installed at ZDV in 12/96. A full field evaluation of	Partially Funded

				the UPR Transition Airspace Tool was completed by NASA at Denver in September 1997. A process for Technology Transfer of the UPR Transition Airspace Tool is viewed as a source of requirements And re-usable components fo the PCP initiave. The Free Flight Evaluation System (FFES) is a MITRE/CAASD resaerch activity at Kansas City Center looking at long-term requirements for automation to support free flight. NO detailed FAA evaluation of the FFES is planned. The FFES is still at a concept exploration stage. FFES is viewed as a source of requirements for the FCP capability and later enhancements.	

19. Deploy a ground-based conflict probe in the near term to accelerate the selection and development of a conflict probe with automated planning aids to assist controllers in the identification and resolution of conflicts.	b. With users and NATCA, the FAA will develop an incremental plan and concept for deploying components of conflict probe prototypes to improve functionality. This plan will identify procedural and regulatory changes and agreements that will be needed to address issues of operational deployment.	7/96	9/99	FAA's development strategy for the ICP has been focused largely on the URET operational prototype, user acceptance, and display refinement. A URET implementation viability assessment was completed in 12/96. MITRE CAASD is continuing to refine the detailed technical requirements for key areas of the ICP capability; these areas include Interfacility Automation (IFA) and conflict probability prediction. Options being explored for the ICP implementation are rearchitecting URET as an integral part of DSR to achieve the initial DSR ICP requirements and specifications. A formal investment decision (JRC) on the full scale implementation of ACD-D is scheduled for March 1998. Data being collected for the JRC include cost, benefits, schedule, and technical requirements baseline data. Part of this process includes a benefits assessment at ZID in January 1998. Specification of the follow-on or future conflict probe (FCP) (integrated ICP/DA/TMA) or ERATMDST system was initiated 4/97; an initial draft specification is scheduled for release in 3/99. Operational evaluation of this system will be phased from a basic capability of ICP being provided to the R-Side and TMA to the D-Side, up to and including full integration and similar capabilities available to both the D- and R-Sides.	Partially Funded

19. Deploy a ground-based conflict probe in the near term to accelerate the selection and development of a conflict probe with automated planning aids to assist controllers in the identification and resolution of conflicts.	c. With users and NATCA, the FAA will evaluate limited deployment prototypes and will determine if, where and when it will be possible to implement components of those prototypes to provide benefit before DSR implementation. (Move from prototype to local operational deployment.)	1/97	10/98	FAA's development strategy for ICP has been focused largely on the URET operational prototype. User acceptance and display refinement are most advanced for the URET system. A URET Technology Transfer process from MITRE CAASD to FAA and its contractors is complete. MITRE CAASD is continuing to refine the detailed technical requirements for key areas of the ICP capability; these areas include Interfacility Automation (IFA) and conflict probability prediction. The implementation of ICP is planned as the first Pre-Planned Product Improvement (PPPI) for DSR. A formal investment decision (JRC) is planned for full scale implementation of ICP by 3/98. Cost, benefit, schedule, and technical requirements baseline data are being collected to support the decision for ICP. The URET operational prototype will be installed "as-is" at all sectors in ZID and ZME in 1998. It will be used eight hours a day, five days per week, expanding up to 16 hours a day,, 5 or 7 days per week. Daily use of URET began at ZID in 9/97 and ZME in 11/97. The daily use system will be used to gather data to support operational development of the FSD ICP system.	Not Funded

19. Deploy a ground-based conflict probe in the near term to accelerate the selection and development of a conflict probe with automated planning aids to assist controllers in the identification and resolution of conflicts.	d. Implement components of conflict probe prototypes to provide benefit before DSR implementation: (Move from local deployment to national deployment).	7/96	9/99	FAA's development strategy for the ICP has been focused largely on the URET prototype. User acceptance and display refinement are more advanced for the URET system than other candidate systems. A URET implementation viability assessment was completed in 12/96. MITRE CAASD is continuing to refine the detailed technical requirements for key areas of the ICP capability; these areas include Interfacility Automation (IFA) and conflict probability prediction Options explored for the ICP implementation were URET software, rearchitecting URET as an integral part of DSR, or re-using portions of various systems and prototypes (e.g., CTAS, UPR, URET) to achieve DSR ICP requirements. The decision was made to use URET. A formal investment decision (JRC) on the full scale implementation of ACD-D is scheduled for March 1998. Data being collected for the JRC includes cost, benefits, schedule, and technical requirements baseline data. The URET operational prototype will be installed "as-is" to all sectors at ZID and ZME by early 1998. It will be used initially eight hours per day, five days per week, evolving to 16 hours a day/5 or 7 days a week. Daily use began at ZID in 9/97 and ZME in 11/97. The daily use system will be used to gather data to support operational development of the FSD ICP system.	Partially Funded
FAA Office: AOZ Industry Lead: ATA NATCA	Point of Contact: John Rekstad Point of Contact: Joe Dorfler Mike Connor		Phone: Phone:	202-233-2975 202-626-4010 202-223-2900	

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Rec #	Initiative	Start	Finish	Status	Funding Profile
20a. Expedite the implementation of the technologies and capabilities (e.g., CTAS) necessary for improved transition to, from, and operations in the terminal airspace. Including the ability to sequence and schedule aircraft arriving on unstructured routes.	a. Implement CTAS Build-1 prototype at appropriate sites identified by FAA and industry. Build-1 includes miles-in-trail separation, meter-fix & runway crossing times, demand information, arrival traffic in plan view format, alerts for predicted over capacity, automated NAPRS delay reporting, and inter-facility coordination (ARTCC-TRACON).	1/96	7/97	CTAS Build 1 has been deployed at Denver, Atlanta, Los Angeles, and Miami ARTCC/TRACONs. The CTAS program office has undertaken an evaluation of Build 1 at Atlanta, Los Angeles, and Miami in order to measure benefits achieved. As prototype systems deploy on a "Fast Track" basis, the CTAS Build 1 systems are contractor supported. Contractor personnel are responsible for maintenance of the software and of the leased hardware. No O&M funds have been appropriated.	Fully Funded

20a. Expedite the implementation of the technologies and capabilities (e.g., CTAS) necessary for improved transition to, from, and operations in the terminal airspace. Including the ability to sequence and schedule aircraft arriving on unstructured routes.	b. Refine and harden CTAS Build-2 functionality—meter lists with crossing times and delay estimates displayed on ARTCC displays, arrival aircraft runway assignment, and arrival aircraft sequence number on Tracon displays.	1/96	6/02	The NASA P-FAST prototype was evaluated at DFW TRACON from 3/96 through 7/96. Data indicates an average peak arrival rate increase of 9.3% in IFR, 10% in VFR and an average departure queue reduction of 9%, for an overall increase of 13% in total operations per hour. (Data based on mid-day arrival rushes). The NASA TMA Build 2 prototype was installed at Fort Worth ARTCC in 6/96; preliminary evaluations indicate a 1-2 minute delay reduction per arrival aircraft during peak traffic periods. CTAS-funded R&D personnel have sustained the TMA Build 2 system in operational use since 7/96. P-FAST use was discontinued in 7/96 due to the installation of an ARTS IIIE at DFW. Resumption of P-FAST operations with the ARTS IIIE at DFW is expected in 6/98. CTAS operations at DFW/ZFW are dependent on F&E funded contract support, as the prototypes are not supported by FAA maintenance personnel. The NASA CTAS Build-2 software has been transitioned to an FAA software development contractor, Computer Sciences Corporation (CSC), working under the En Route Software Development and Support (ERSDS) contract. CSC will re-engineer the software to make it operationally deployable and sustainable throughout the NAS, with a 6/02 target date for first site Initial Operational Capability (IOC). This 6/02 first IOC date reflects the impact of a lower than anticipated FY 98 budget on the development and deployment schedule for a single-center and multi-center TMA and a passive FAST capability.	Partially Funded

20a. Expedite the implementation of the technologies and capabilities (e.g., CTAS) necessary for improved transition to, from, and operations in the terminal airspace. Including the ability to sequence and schedule aircraft arriving on unstructured routes.	c. Implement CTAS Build-2 prototype at FAA/Industry approved sites for operational deployment.	6/96	6/02	NASA's P-FAST prototype use was discontinued in 7/96 due to the installation of an ARTS IIIE at DFW. Resumption of P-FAST with the ARTS IIIE at DFW is expected in 6/98. The FAA's CTAS development contractor is presently re-engineering the Build 2 software, targeting 6/02 for the release of an operationally-sustainable system for deployment throughout the NAS. P-FAST deployments are limited to ARTS IIIE-equipped sites until a STARS upgrade for CTAS is available; this is presently planned for 2001. Due to overall FAA budget constraints, FAA's ASD has recommended, in the NAS 2.0 architecture, that CTAS Build 2 development continue, but that deployment be deferred until after 2001. The TMA/FAST schedule reflects the impact of the NAS architecture recommendations and a lower than anticipated FY 98 budget on the development and deployment schedule for a single-center and multi-center TMA and a passive FAST capability.	Partially Funded

20a. Expedite the implementation of the technologies and capabilities (e.g., CTAS) necessary for improved transition to, from, and operations in the terminal airspace. Including the ability to sequence and schedule aircraft arriving on unstructured routes.	d. FAA/Industry to evaluate capabilities to develop fuel efficient and conflict free paths to runway to address procedural and technical integration issues (through laboratory and field evaluation) to support later development and deployment.	TBD	TBD	In 1996, NASA initiated research into "active" arrival/departure advisory automation that might be extended to support extended terminal-area free flight. No FAA effort has been initiated to define the operational concept or detailed requirements for a terminal active advisory system. Since no FAA funding is available for the "active" advisory effort, NASA funding would have to be used. The schedule for NASA activities would require the installation of a STARS-type display capability in an ARTS IIIE environment, prior to the availability of a full STARS system. In the en route environment, FAA automation efforts have focused on the development of "conflict probe" automation to evaluate user-requested routes for potential conflicts (See RTCA recommendation 19). Operational concepts and preliminary specifications have been defined, and the cost/benefit studies for an initial capability are underway. NASA and MITRE/CAASD are engaged in research to support more advanced en route concepts for free flight. FAA funding for terminal and en route free flight-related automation is contained in the CTAS and AERA program budgets. Current budget projections are insufficient for the level of effort required to achieve all free flight objectives.	Not Funded

20a. Expedite the implementation of the technologies and capabilities (e.g., CTAS) necessary for improved transition to, from, and operations in the terminal airspace. Including the ability to sequence and schedule aircraft arriving on unstructured routes.	e. Collaboratively with users, examine CRDA use to assess expansion to new sites.	10/96	4/97	CASA was transitioned to the terminal domain for full scale development in 4/97.	Fully Funded
FAA Office: AOZ Industry Lead: ATA NATCA	Point of Contact: John Rekstad Point of Contact: Ray Hilton Mike Conner		Phone: Phone: 202 223-2900	202-233-2975 202-626-4010	

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Rec #	Initiative	Start	Finish	Status	Funding Profile
21. In cooperation with the airspace users, investigate the technical feasibility, safety, cost, and benefits of using GPS WAAS as an en route vertical reference, e.g., for RVSM.	a. Briefing to Architecture Working Group on implications of using GPS altimetry in vertical separation.	6/96	1.Complete 2.Complete 3.TBD 4.TBD	1. AIR-100 requested the RTCA SC-159 examine the possibility of using GPS derived altimertry for en-route navigation. 2. The issue was discussed at the April 1997 meeting of RTCA SC-159. A small ad-hoc working group was formed under the leadership of the NavCanada representative to develop a position paper. 3. The position paper is expected to be completed during the next meeting of SC-159 and submitted to AIR-100. 4. AIR-100 to brief the Free Flight Select Committee in 4Q97 on the outcome of the RTCA evaluation.	
FAA Office: AIR-100	Point of Contact: Jim Williams		Phone:	202-267-9897	

Rec #	Initiative	Start	Finish	Status	Funding Profile
22. The FAA should support the Meteorological Data Collection and Reporting System (MDCRS) to enhance the quality and quantity of real-time aircraft-reported weather information.	a. National Weather Service (NWS) review of processing options for aircraft meteorological data.		7/97	The NWS review of processing options is complete. The ARINC corporation will continue to decode the ACARS data from the airlines and process it into the MDCRS format. The data is processed on a platform called the ATS server which replaced the TANDEM processor. Deployment was completed July 1997.	
22. The FAA should support the Meteorological Data Collection and Reporting System (MDCRS) to enhance the quality and quantity of real-time aircraft-reported weather information.	b. Memorandum of agreement on cost sharing between the FAA and NWS.	4/96	10/98	The establishment of a Memorandum of Agreement on cost sharing between the FAA and NWS has not been formalized. However, under the current ARINC contract the FAA and the NWS has shared the cost by 50% for the development of the new ATS server. The ATS server processes the MDCRS data and sends it via communication circuits to the NWS gateway. Contract negotiations are currently underway to award a new contract to a selected vendor to provide MDCRS service. Contract award is expected to be complete by December 98. Cost sharing agreement for future contacts is complete.	
22. The FAA should support the Meteorological Data Collection and Reporting System (MDCRS) to enhance the quality and quantity of real-time aircraft-reported weather information.	c. Industry sponsored user education program to solicit participation by more of aircraft.	6/96	ongoing	ARINC continues to sponsor user education programs to solicit participation from airlines. Forecast systems Laboratory (FSL) sponsored a MDCRS working group in June 98 to inform airlines on the benefits of the MDCRS data. FEDEX currently participating in trail data collection of meteorological data via ACARS to FSL.	
FAA Office: ARW-200 Industry Lead: ATA	Point of Contact: Rick Heuwinkel Point of Contact: Joe Dorfler		Phone: Phone:	202-366-4940 202-626-4025	

Note: Congress provided funding in 1989 to build an MDCRS capability. The FAA currently pays ARINC for data processing to extract MDCRS data and forward it to NWS. The FAA acts as an agent to facilitate collection of data that could be funded by NWS. Aircraft equipage will be at the expense of the users

Rec #	Initiative	Start	Finish	Status	Funding Profile
23 Develop the capability--starting with existing capabilities--to generate more accurate forecasts on convective weather for use in flight and operational planning.	a. Program plan for weather research, including thunderstorm growth and decay and thunderstorm movement.	3/96	TBD		
23 Develop the capability--starting with existing capabilities--to generate more accurate forecasts on convective weather for use in flight and operational planning.	b. Brief Free Flight Steering Committee on FAA commitments to develop convective weather forecast improvements.	9/96	TBD		
23 Develop the capability--starting with existing capabilities--to generate more accurate forecasts on convective weather for use in flight and operational planning.	c. Architecture issue resolution: Architecture and transition of flight planning services & advisory services.		TBD		
23 Develop the capability--starting with existing capabilities--to generate more accurate forecasts on convective weather for use in flight and operational planning.	d. Define and implement OASIS.	TBD	TBD		
FAA Office: AND-400 ASD-110 Industry Lead: AAL AOPA	Point of Contact: Dave Sanke Vince Schultz Point of Contact: Russ Chew Doug Helton		Phone: Phone:	202-366-4437 202-358-5520 817-967-5153 301-695-2213	

Note: ITWS $P^3$1 plans to include convective growth, decay, and movement, with implementation starting in 2000-2001.

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Rec #	Initiative	Start	Finish	Status	Funding Profile
B. Work with the user community to achieve consensus on the role and timing of ADS-B technology in delivering specific near- and long-term benefits.	a. Develop a list of near and long term benefits for the user community if they equip with ADS-B.	10/96	TBD	This effort will continue under Safe Flight 21 and the work sponsored by the ADS-B Steering Committee..	Partially Funded
B. Work with the user community to achieve consensus on the role and timing of ADS-B technology in delivering specific near- and long-term benefits.	b. Conduct analyses to quantify benefits of selected operational concepts and system architectures.	10/99	TBD		Not Funded
B. Work with the user community to achieve consensus on the role and timing of ADS-B technology in delivering specific near- and long-term benefits.	c. Architecture issue resolution: Develop and include in version 2.5 of the NAS Architecture the timing and transition of surveillance capabilities.		Completed	ADS-B and cockpit-based capabilities are reflected in the NAS Architecture 98, as well as air-ground surveillance capabilities (operational circa 2008).	
B. Work with the user community to achieve consensus on the role and timing of ADS-B technology in delivering specific near- and long-term benefits.	d. Complete system MASPS and avionics MOPS.		9/99	The ADS-B MASPS was completed March 1998. The MOPS for ADS-B is tentatively scheduled for September 1999.	Funded
B. Work with the user community to achieve consensus on the role and timing of ADS-B technology in delivering specific near- and long-term benefits.	e. Initial Operational Capability of first air-to-air application.	12/98	TBD	Safe Flight 21 includes air-to air application(IOC expected mid-2000)	Partially Funded
B. Work with the user community to achieve consensus on the role and timing of ADS-B technology in delivering specific near- and long-term benefits.	f. Determine role of ground based infrastructure.	FY99	FY01	Safe Flight 21 will begin to provide and evaluate ADS-B ground stations.	Funded
B. Work with the user community to achieve consensus on the role and timing of ADS-B technology in delivering specific near- and long-term benefits.	g. Develop and install ground infrastructure as defined in (f).	FY99	FY01	Safe Flight 21 will begin to provide and evaluate ADS-B ground stations.	Funded
FAA Office: AND-470 ASD-100 Industry Lead: RTCA SC-169/WG-5	Point of Contact: Richard Lay Ann Tedford Point of Contact: Rocky Stone		Phone: Phone:	202-267-7768 202-358-5432 719-282-0256	

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Rec #	Initiative	Start	Finish	Status	Funding Profile
24. Develop methodology and tools to measure and predict dynamic density.	a. Use modeling tools to identify the parameters of dynamic density and to characterize issues.	5/96	TBD	Capability currently in concept exploration.	Partially Funded
24. Develop methodology and tools to measure and predict dynamic density.	b. Develop concept for how metrics would be used operationally for both TFM and ATC.	10/96	TBD		
24. Develop methodology and tools to measure and predict dynamic density.	c. Plan and conduct human-in-the-loop experiments to develop dynamic density metrics and to understand the predictability of airspace density. Determine the level of intent information required.	TBD	TBD		
24. Develop methodology and tools to measure and predict dynamic density.	d. Investigate impact of dynamic density on free scheduling, routing, and maneuvering.	TBD	TBD		
24. Develop methodology and tools to measure and predict dynamic density.	e. Perform field tests at selected sites to validate the operations concept and the ability of metrics to predict airspace manageability.	TBD	TBD		
24. Develop methodology and tools to measure and predict dynamic density.	f. Incorporate successful metrics into Monitor Alert (or its replacement) and into ATC decision support systems, as appropriate.	TBD	TBD		
FAA Office: AOZ Industry Lead: ATA NATCA	Point of Contact: Bob Voss Point of Contact: Jack Ryan Mike Connor		Phone: Phone:	202-493-0385 202-626-4025 202-223-2900	

Note: results will be incorporated into DSS development for conflict probe, traffic sequencing, other traffic management /controller automation tools, and planned changes to ETMS to measure projected system workload and traffic complexity. Dynamic density measures need to accommodate levels of uncertainty – short-term knowledge of intent, no directional altitudes, cruise/climb without specific clearances.

Rec #	Initiative	Start	Finish	Status	Funding Profile
25. Develop, evaluate, and implement TFM capability for a cooperative exchange of information among the users and the FAA that will enable user involvement in the FAA's TFM decision making process. 25a. Building on existing activities, such as TFMART and FADE, and related programs, the FAA and users must determine the details of an improved user-TFM interaction. 25b. In concert with the users, FAA must aggressively pursue the testing and implementation of development programs, and/or more flexible procedures, aimed at supporting the cooperative exchange of real-time data and information between the users and TFM system. Start now by developing TFM scenarios with the users that substitute controlled time of arrival (CTA) instead of the currently employed departure clearance time. Evaluate this soon at one airport.	a. The FAA and users will jointly define operational requirements for information exchange through participation in RTCA SC-169, working group 5.		10/96	CDM Ground Delay Program Enhancements Operational Prototype Summer 1997	Partially Funded
	b. Utilizing TFMART and FADE work, the FAA and industry (through an evolution of the CDM working group) have developed and will continue to coordinate a concept for future NADS operations that documents concepts of improved user TFM interactions.		Ongoing	NAS Status Information CDM Collaborative Routing Operational/Procedural Enhancements Ongoing	
	c. The work plan for the CDM Working Group will incorporate all items within Rec. 25. This work program will evolve to address the cooperative exchange issues in this recommendation.		Ongoing	Concept Development Activities/Prototypes - Whiteboarding Spring 1997 - Northeast Airport FAA Info Exchange May 1997 Collaborative Maneuvering TBD	
FAA Office: AOZ Industry Lead: ATA	Point of Contact: Bob Voss Point of Contact: Jack Ryan		Phone: Phone:	202-493-0385 202-626-4025	

Note: The same team working on recommendations 7, 8, 14, and 15 will perform these actions.

Rec #	Initiative	Start	Finish	Status	Funding Profile
26. FAA and users should establish procedures for aircraft to aircraft separation when separation responsibility may be transferred to the aircraft by the air traffic service provider on a case by case basis.	a. Situational display capabilities and performance requirements for the equivalent of visual separation by electronic means identified following work on CDTI MOPS.	2/98	12/99	Proposed in conjunction with Safe Flight 21 Cargo Airline CRDA. Flight Standards (AFS) is holding operations and issues resolution meetings.	See funding comments under No. 18.
26. FAA and users should establish procedures for aircraft to aircraft separation when separation responsibility may be transferred to the aircraft by the air traffic service provider on a case by case basis.	b. Develop candidate procedures and policies.	9/97	12/99	Ongoing.	
26. FAA and users should establish procedures for aircraft to aircraft separation when separation responsibility may be transferred to the aircraft by the air traffic service provider on a case by case basis.	c. Simulation of safety encounters with controllers and pilots in-the-loop.	TBD	TBD	No funding for simulation until FY-99.	
26. FAA and users should establish procedures for aircraft to aircraft separation when separation responsibility may be transferred to the aircraft by the air traffic service provider on a case by case basis.	d. Development and publication of rules for self-separation and the transfer of control procedure.	TBD	TBD	No funding available until FY-99.	
FAA Office: AND-470 AFS-400 AND-600/NASA ATO-400 Industry Lead: ALPA ATA	Point of Contact: Richard Lay Gary Livack Jim McDaniel Keith Dutch Point of Contact: Ward Baker Jack Ryan		Phone: Phone:	202-267-7768 202-267-7954 202-267-9870 202-267-9332 703-689-4205 202-626-4025	

Rec #	Initiative	Start	Finish	Status	Funding Profile
27. Implement precision missed approaches and precision simultaneous approaches and departures.	a. FAA/Industry formed a converging approach standards working group (CASTWG) to investigate reduced landing minima for converging approaches.	1993	Ongoing	The converging Approach Standards Work Group (CASTWG) is on hold for the near term. They investigated the feasibility of converging approaches into DFW and ORD. DFW became a moot point when the facility was approved for a sixth parallel runway. Meetings were held at ORD in February and May 1998 to address concerns over the converging instrument approach proposal. Some concerns, i.e. dual balked approaches and sorting of FMS equipped aircraft were not sufficiently satisfied to gain industry-user/controller support. Data collection to validate 650' and 500' minima in progress using NASA B747/400 and UAL B737/300 simulators	
27. Implement precision missed approaches and precision simultaneous approaches and departures.	b. Develop proof-o-concept test scenarios through simulations. Conduct statistical analysis of approach scenarios. – Initial phase reduction of minimums to 650 ft at ORD and DFW – Final phase reduction of minimums to 500 ft.	11/93	6/97	Modeling completed for missed approach procedure all indications point to success. Other issues and concerns from NATCA & ALPA to be addressed possibly with more modeling Completed.	
27. Implement precision missed approaches and precision simultaneous approaches and departures.	c. Identify additional candidate airports for reduced landing minima associated with precision missed approaches during simultaneous converging approaches, and assess potential benefit to users community.	10/96	7/97	Greater Cincinnati (CVG) has initiated steps to implement the Converging Runway Display Aid (CRDA) program, "ghosting", in VFR conditions. Only airport identified at this time is ORD. DFW is considered another option.	
27. Implement precision missed approaches and precision simultaneous approaches and departures.	d. Live aircraft demonstrations of the developed approach procedures and criteria, as required.	8/96	8/97	UAL flew proposed procedure with a B757. The demonstration performed as expected/predicted from previous modeling Completed	
27. Implement precision missed approaches and precision simultaneous approaches and departures.	e. Implement approaches at identified airports. – Initial phase reduction of minimums to 650 ft at ORD and DFW – Final phase reduction of minimums to 500 ft	3/97	Indefinite	Delayed indefinitely as concerns are addressed i.e. sorting A/C which can perform the procedure (/E, /F), How many A/C capable of procedure right now, etc.	

27. Implement precision missed approaches and precision simultaneous approaches and departures.	f. Investigate reduced separation standards for precision simultaneous departures.	TBD	TBD	Awaiting more modeling by flight standards to ascertain available options for reduced separation.	
FAA Office: ASC-100 ATO-120.4 Industry Lead: ATA	Point of Contact: Ken Peppard Jim Ratkus Point of Contact: Jack Ryan		Phone: Phone:	202-267-7375 202-267-9150 202-626-4025	

Rec #	Initiative	Start	Finish	Status	Funding Profile
28. Investigate the possibility of increasing runway acceptance by permitting two aircraft to occupy the runway at the same time.	a. Conduct feasibility analysis, including review of international practices.	9/96	TBD	This item is being held in abeyance until final details concerning land and hold short operations can be finalized.	No Funding
28. Investigate the possibility of increasing runway acceptance by permitting two aircraft to occupy the runway at the same time.	b. Formulate proposal for review by ATPAC.	TBD	TBD	At this time there is no scheduled ATPAC proposal because some of the pilot organizations have concerns that regard allowing two aircraft on the same runway at the same time.	
28. Investigate the possibility of increasing runway acceptance by permitting two aircraft to occupy the runway at the same time.	c. Complete ATPAC review.	TBD	TBD	At this time there is no ATPAC review scheduled.	
FAA Office: ATO-100 Industry Lead: NATCA ATA	Point of Contact: Point of Contact: Jim Gordon Jack Ryan		Phone: Phone:	 202-493-4073 202-626-4025	

Note: This initiative is targeted at two arriving aircraft. In conduction the ATPAC review, issues are likely to require simulation, including human-in-the-loop.

Rec #	Initiative	Start	Finish	Status	Funding Profile
29. Additional expansion of the NRP below FL 290 should be explored. Accelerate modeling and analysis efforts needed to facilitate the continued expansion of the NRP.	a. Form a working group consisting of industry, NATCA, and FAA to identify methods to accommodate user preferred routing below FL 290.	10/96	TBD	Work groups have been formed and are meeting. Refer to RTCA recommendation 5.	Fully Funded
29. Additional expansion of the NRP below FL 290 should be explored. Accelerate modeling and analysis efforts needed to facilitate the continued expansion of the NRP.	b. Conduct modeling and simulation to identify impacts of increased user preferred routing below FL 290. Evaluate airspace capacity and demand, sector design, controller workload, communication, and information requirements.	10/96	3/97	MITRE-CAASD study complete.	Fully Funded
29. Additional expansion of the NRP below FL 290 should be explored. Accelerate modeling and analysis efforts needed to facilitate the continued expansion of the NRP.	c. Build on FAA/NATCA composite direct route document with fixes for direct routing at lower altitudes.	4/96	TBD	Deferred until enhancements to program are completed in RTCA recommendation 5.	
FAA Office: ATD-230 Industry Lead: ATA NATCA	Point of Contact: Elliot Reid Point of Contact: Jack Ryan Mike Connor		Phone: Phone:	703-904-4436 202-626-4025 202-223-2900	

Note: The FAA and NATCA are currently developing a direct route document which is designed to increase the ability of controllers to clear aircraft direct, provide intermediate way points to keep clear of active SUA, and address separation from terrain.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
30. Issue an Advanced Notice of Proposed Rule-making regarding implementation of domestic reduced vertical separation minima (RVSM) above FL 290.	a. Draft ANPRM available		9/96		
30. Issue an Advanced Notice of Proposed Rule-making regarding implementation of domestic reduced vertical separation minima (RVSM) above FL 290.	b. Issue ANPRM		1/97		
30. Issue an Advanced Notice of Proposed Rule-making regarding implementation of domestic reduced vertical separation minima (RVSM) above FL 290.	c. Benefit/Cost and Risk analysis for NPRM	TBD	TBD		
30. Issue an Advanced Notice of Proposed Rule-making regarding implementation of domestic reduced vertical separation minima (RVSM) above FL 290.	d. Issue NPRM	TBD			
30. Issue an Advanced Notice of Proposed Rule-making regarding implementation of domestic reduced vertical separation minima (RVSM) above FL 290.	e. Issue final rule	TBD			
FAA Office: Industry Lead: ALPA	Point of Contact: Point of Contact: Bob Swain		Phone: Phone:	 703-689-4200	

Rec #	Initiative	Start	Finish	Status	Funding Profile
31. The FAA should determine the requirements for reduced en route horizontal separation standards, including surveillance performance.	a. In conjunction with the appropriate RTCA Special Committees (SC), define/develop the following concepts in coordination with appropriate ICAO Panels (e.g. RGCSP, AWOP) Required Navigation Performance (RNP)-SC 181; Required Communication Performance (RCP)-SC 169; Required Monitoring Performance (RMP)-SC 186; and Required System Performance (RSP).	6/96		A new collision risk model for reduced en route horizontal separation standards has not yet been developed, therefore, associated operational concepts and implementation plans have not yet been developed.	
31. The FAA should determine the requirements for reduced en route horizontal separation standards, including surveillance performance.	b. Develop a new collision risk model based on concepts from a.	6/96	6/98		
31. The FAA should determine the requirements for reduced en route horizontal separation standards, including surveillance performance.	c. Based on the new/revised collision risk model, develop operational concepts for reduced separation standards for specific airspace (e.g. en route, terminal).	6/98	6/99		
31. The FAA should determine the requirements for reduced en route horizontal separation standards, including surveillance performance.	d. Develop an implementation plan(s) for adopting reduced separation standards.	6/98	6/99		
FAA Office: ATO-100 ASD-100 Industry Lead: ATA NATCA	Point of Contact: Bill Mosley Carmine Primeggia Point of Contact: Joe Dorfler Mike Connor		Phone: Phone:	202-267-7824 202-358-5523 202-626-4010 202-223-2900	

Rec #	Initiative	Start	Finish	Status	Funding Profile
32. Begin rule-making to remove the 250 knots below 10,000 feet restriction in Class B airspace.	a. Using existing laboratory simulation capabilities, evaluate removing the 250-knot restriction, assessing capacity, environmental (noise), safety and workload issues. – Initial simulations		ongoing	The field test at Houston has provided partial validation of the operational feasibility of modifying or removing the 250 knot speed limit for departing aircraft. The results of the preliminary evaluation are, for the most part, positive. Even where metrics indicated some impacts to the areas examined, the results may be considered positive in the sense that the test did not produce any conclusive indication that modifying the speed restriction is unworkable. We are currently forming a joint industry/FAA working group. The first meeting will be held in Houston Nov. 18, 1998, to produce issues and work toward resolution of those issues.	
32. Begin rule-making to remove the 250 knots below 10,000 feet restriction in Class B airspace.	b. Field test restriction removal at selected airports.		ongoing	The field test at Houston Intercontinental began Jun 26, 1997. Based on the preliminary evaluation FAA is recommending that the test be extended to a second site.	
32. Begin rule-making to remove the 250 knots below 10,000 feet restriction in Class B airspace.	c. Implement restriction removal incrementally	TBD	TBD	Pending completion of field testing.	
FAA Office: ATO-120 Industry Lead: ATA NATCA ALPA	Point of Contact: Vanessa Alexander Point of Contact: Jack Ryan Allen Alexander Bob Striegel		Phone: Phone: 218-230-8400 703-689-4205	202-267-7389 202-626-4025	

Note: No rule making is required for the field tests. Authority exists within the waiver authority of the Administrator. Rule making schedule, as required, will be developed based on the results of the field tests.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
33. The FAA should study human perceptions and responses associated with the time and distance buffers that separate aircraft (protected and alert zones). FAA must determine that proposed changes in separation rules and maneuver limits do not increase perceived hazards, statistical risks, and experienced discomfort. FAA must show that the proposed changes will make the present system more efficient, safe, or economical before implementation.	a. Perform initial analysis to determine time and distance buffers required to maintain or increase the current level of safety in a free flight environment. Analysis should include different flight domains and assumptions about equipage and human responsibilities.				
33. The FAA should study human perceptions and responses associated with the time and distance buffers that separate aircraft (protected and alert zones). FAA must determine that proposed changes in separation rules and maneuver limits do not increase perceived hazards, statistical risks, and experienced discomfort. FAA must show that the proposed changes will make the present system more efficient, safe, or economical before implementation.	b. Develop preliminary procedures for controllers and pilots to work with proposed time and distance buffers for separating aircraft.				

33. The FAA should study human perceptions and responses associated with the time and distance buffers that separate aircraft (protected and alert zones). FAA must determine that proposed changes in separation rules and maneuver limits do not increase perceived hazards, statistical risks, and experienced discomfort. FAA must show that the proposed changes will make the present system more efficient, safe, or economical before implementation.	c. Develop or enhance existing test bed to simulate air traffic control (ATC) operations, using time and distance buffers. Perform initial simulation with simulated controllers and pilots and use to evaluate the use of time and distance buffers in each flight domain.				
33. The FAA should study human perceptions and responses associated with the time and distance buffers that separate aircraft (protected and alert zones). FAA must determine that proposed changes in separation rules and maneuver limits do not increase perceived hazards, statistical risks, and experienced discomfort. FAA must show that the proposed changes will make the present system more efficient, safe, or economical before implementation.	d. Develop or use existing test bed to simulate flight deck operations, using cockpit display of time and distance buffers.				

33. The FAA should study human perceptions and responses associated with the time and distance buffers that separate aircraft (protected and alert zones). FAA must determine that proposed changes in separation rules and maneuver limits do not increase perceived hazards, statistical risks, and experienced discomfort. FAA must show that the proposed changes will make the present system more efficient, safe, or economical before implementation.	e. Develop scenarios for flight deck and ATC human-in-the loop (HITL) simulation consisting of various levels of traffic density, aircraft mix, and contingency and emergency conditions.				
33. The FAA should study human perceptions and responses associated with the time and distance buffers that separate aircraft (protected and alert zones). FAA must determine that proposed changes in separation rules and maneuver limits do not increase perceived hazards, statistical risks, and experienced discomfort. FAA must show that the proposed changes will make the present system more efficient, safe, or economical before implementation.	f. Develop metrics (objective and subjective measures) to study controller and pilot perception of hazards, risk, and discomfort levels. Appropriate measures of situation awareness, performance, and workload will also be developed to assess pilot and controller responses to time and distance buffers.	1/97	12/97	Results from several studies suggest that there is a consistent point in operations that controllers feel they need to intervene. The six to twelve variables that are used to measure that point covary with load and seem to be consistent. The next step is to see if the flight crew shares this same appreciation for airspace density.	50%

33. The FAA should study human perceptions and responses associated with the time and distance buffers that separate aircraft (protected and alert zones). FAA must determine that proposed changes in separation rules and maneuver limits do not increase perceived hazards, statistical risks, and experienced discomfort. FAA must show that the proposed changes will make the present system more efficient, safe, or economical before implementation.	g. Conduct HITL simulations for assessing controller and pilot perceptions of hazards, risks, and discomfort. Performance, workload, and situation awareness associated with controller and pilot responses to time and distance buffers will be measured.	8/96	12/97	Two full mission simulations were completed. For both simulations it was assumed that all aircraft were equipped and that ATC was in a monitoring role. The results suggest that aircraft can successfully self-separate (under the conditions of the simulations) and the crews are fairly comfortable handling this requirement. Additionally, aircrew communications within and between aircraft increased. The next steps are to include the integration of a ground conflict probe and controller operations, followed by the inclusion of a mixed equipage fleet. This was as initial study evaluation of some of the potential effects of free flight on controllers' ability to maintain an accurate and complete picture of the traffic situation. The results suggest that (under the conditions of the simulation which used current technologies and displays) if controllers are expected to act as passive monitors of free flight air traffic, their awareness of the state of air traffic may be reduced, their workload may increase, and their ability to intervene in a timely manner may be somewhat limited. The capabilities of new technologies, displays, practice and experience for dealing with these concerns need to be explored.	

33. The FAA should study human perceptions and responses associated with the time and distance buffers that separate aircraft (protected and alert zones). FAA must determine that proposed changes in separation rules and maneuver limits do not increase perceived hazards, statistical risks, and experienced discomfort. FAA must show that the proposed changes will make the present system more efficient, safe, or economical before implementation.	h. Assess system efficiency and safety using the subjective and objective data gathered from simulation (under the en route, terminal, and oceanic environments). Update initial analysis based on simulation results. Based on these assessments, evaluate the economic impact of proposed time and distance buffers for separating aircraft.				
FAA Office: AAR-100 ACT-500 Industry Lead: ATA	Point of Contact: Tom McCloy Paula Nouragas Point of Contact: Jack Ryan		Phone: Phone:	202-267-7125 609-485-4751 202-626-4025	

Note: Completion of the initiatives under this recommendation is a necessary precursor to the implementation of full free flight.

Rec #	Initiative	Start	Finish	Status	Funding Profile
34. Real-time human-in-the-loop simulations should be conducted to systematically study controller and pilot behaviors, interactions, and effects within NAS environments that represent dynamic densities and sector configurations anticipated for free flight.	a. Examine existing tools and techniques to assess suitability for resolving free flight dynamic density problems.	10/96	TBD		
34. Real-time human-in-the-loop simulations should be conducted to systematically study controller and pilot behaviors, interactions, and effects within NAS environments that represent dynamic densities and sector configurations anticipated for free flight.	b. Develop preliminary procedures for controllers to operate in a dynamic density and dynamic sectorization environment.	2/97	TBD		
34. Real-time human-in-the-loop simulations should be conducted to systematically study controller and pilot behaviors, interactions, and effects within NAS environments that represent dynamic densities and sector configurations anticipated for free flight.	c. Develop or use existing test bed to simulate various dynamic density and dynamic sectorization environments.	2/97	TBD		
34. Real-time human-in-the-loop simulations should be conducted to systematically study controller and pilot behaviors, interactions, and effects within NAS environments that represent dynamic densities and sector configurations anticipated for free flight.	d. Develop scenarios consisting of various levels of dynamic density and dynamic sectorization configurations.	6/97	TBD		

34. Real-time human-in-the-loop simulations should be conducted to systematically study controller and pilot behaviors, interactions, and effects within NAS environments that represent dynamic densities and sector configurations anticipated for free flight.	e. Mature metrics (objective and subjective measures) to study controller and pilot performance, workload, situation awareness, behavior, and communications under dynamic density and dynamic sectorization environment.		TBD		
34. Real-time human-in-the-loop simulations should be conducted to systematically study controller and pilot behaviors, interactions, and effects within NAS environments that represent dynamic densities and sector configurations anticipated for free flight.	f. Conduct human-in-the-loop (HITL) simulations for assessing controller and pilot performance, workload, situation awareness, behavior, and communications under a wide range of dynamic density and dynamic sectorization configurations.	1/97	12/97	Results from several studies suggest that there is a consistent point in operations that controllers feel they need to intervene. The six to twelve variables that are used to measure that point covary with load and seem to be consistent. The next step is to see if the flight crew shares this same appreciation for airspace density.	50% Funded
34. Real-time human-in-the-loop simulations should be conducted to systematically study controller and pilot behaviors, interactions, and effects within NAS environments that represent dynamic densities and sector configurations anticipated for free flight.	g. Based on simulation results, modify the preliminary procedures.	TBD	TBD		
34. Real-time human-in-the-loop simulations should be conducted to systematically study controller and pilot behaviors, interactions, and effects within NAS environments that represent dynamic densities and sector configurations anticipated for free flight.	h. Develop training syllabus based on new procedures.	TBD	TBD		

34. Real-time human-in-the-loop simulations should be conducted to systematically study controller and pilot behaviors, interactions, and effects within NAS environments that represent dynamic densities and sector configurations anticipated for free flight.	i. Evaluate the training syllabus and revised procedures using the test bed or SATOR (if appropriate).	TBD	TBD		
34. Real-time human-in-the-loop simulations should be conducted to systematically study controller and pilot behaviors, interactions, and effects within NAS environments that represent dynamic densities and sector configurations anticipated for free flight.	j. Finalize the procedures and training material.	5/98	TBD		
FAA Office: AAR-100 ACT-500 Industry Lead: ATA	Point of Contact: Tom McCloy Paul Noragas Point of Contact: Jack Ryan		Phone: Phone:	202-267-7125 609-485-4751 202-626-4025	

Note: Completion of the initiatives under this recommendation is a necessary precursor to the implementation of full free flight.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
35. Reemphasize the role of the Airport Improvement Program in increasing airport capacity.	a. Brief industry on airport capital development funding trends with emphasis on AIP and PFC implications on national airport capacity.		ongoing	Anchorage: Will investigate the effect of a runway extension that will intersect the crosswind runway and other short and long term improvements such as a new runway. Newark: Will investigate the effect of a runway extension that will intersect the crosswind runway and other short term improvements, such as approaches to other airport using Newark's DGPS. San Diego: Investigating the effect of another terminal, ground flow and other short term improvements already approved in the Immediate Action Plan. Northeast Study: Studying the effect of increased passenger traffic at the outlying airports in both the New York and Boston areas. Northern California Tracon (NCT): Supports the sectorization of the proposed facility. Identify sector boundaries and estimate staffing; design routes which will reduce complexity, segregate flows by destination and reduce holding and improve fuel consumption. Southern California Tracon (SCT): Analyze dual IFR arrival streams into LAX with segregated routes based on aircraft weight category. Salt Lake City: Design a cornerpost system vs. the current arrival procedure which allows arrivals from nearly all points of the compass.	Fully Funded

35. Reemphasize the role of the Airport Improvement Program in increasing airport capacity.	b. Continue work with the airport and user communities on application of AIP/PFC and alternative funding to develop necessary capacity enhancements.		ongoing	Design team studies, Tactical Initiatives, Terminal Airspace studies and Regional Design studies are ongoing in efforts to proved near-term, mid-term and long-term benefits to capacity enhancements. These studies recommend improvements like runway additions, taxiway additions, new terminals or re-structured airspace for a more efficient flow of inbound/outbound routes. While no determination has been made, a study of the airspace involving Anchorage and Elmendorf AFB is being considered.	Fully Funded
FAA Office: ASC-200 APP-400 Industry Lead: ACI-NA	Point of Contact: Jim McMahon Bob Yatczek Point of Contact: Dick Marchi		Phone: Phone:	202-267-8791	

Note: AIP policy places highest priority on safety and security work, preservation of infrastructure, upgrading to FAA airport design standards, and the, capacity enhancement.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
MT1. Increase FAA ARTCC decision support capabilities as soon as possible to include the total U.S. navigational database.	a. With the expansion of the National Route Program, Air Traffic Operations will identify database limitations and determine the plan for integrating the solution in current FAA ARTCC decision support capabilities.	3/96	7/96	Complete	
MT1. Increase FAA ARTCC decision support capabilities as soon as possible to include the total U.S. navigational database.	b. Implement plan to resolve database limitations.	7/96	8/98	Host update A4e2.1, scheduled for 1998, will address database limitations be adding capability of storing additional fixes, this completes this initiative.	
FAA Office: AUA-200 Industry Lead: American Airlines	Point of Contact: Phil DeCara Point of Contact: Earl Wolfe		Phone: Phone:	202-376-6561 817-967-5131	

Rec #	Initiative	Start	Finish	Status	Funding Profile
MT2. Accelerate and expand programs to support GPS/WAAS as a primary navigation system (e.g., airport surveys, update FAA orders, precision approaches, at majority of airports in CONUS, Hawaii, Southern Alaska, and the Caribbean).	a. Develop WAAS MOPS and TSO.	9/95	12/01		
MT2. Accelerate and expand programs to support GPS/WAAS as a primary navigation system (e.g., airport surveys, update FAA orders, precision approaches, at majority of airports in CONUS, Hawaii, Southern Alaska, and the Caribbean).	b. Develop ground and airborne standards for RFI.				
MT2. Accelerate and expand programs to support GPS/WAAS as a primary navigation system (e.g., airport surveys, update FAA orders, precision approaches, at majority of airports in CONUS, Hawaii, Southern Alaska, and the Caribbean).	c. Validate WAAS MOPS & TSO.				
MT2. Accelerate and expand programs to support GPS/WAAS as a primary navigation system (e.g., airport surveys, update FAA orders, precision approaches, at majority of airports in CONUS, Hawaii, Southern Alaska, and the Caribbean).	d. Develop 500 stand-alone GPS procedures in 1995 and 1996.				

MT2. Accelerate and expand programs to support GPS/WAAS as a primary navigation system (e.g., airport surveys, update FAA orders, precision approaches, at majority of airports in CONUS, Hawaii, Southern Alaska, and the Caribbean).	e. Develop WAAS precision approach procedures, 1 year prior to WAAS IOC (950+ per year).				
MT2. Accelerate and expand programs to support GPS/WAAS as a primary navigation system (e.g., airport surveys, update FAA orders, precision approaches, at majority of airports in CONUS, Hawaii, Southern Alaska, and the Caribbean).	f. Conduct airport surveys (WGS-84).				
MT2. Accelerate and expand programs to support GPS/WAAS as a primary navigation system (e.g., airport surveys, update FAA orders, precision approaches, at majority of airports in CONUS, Hawaii, Southern Alaska, and the Caribbean).	g. Develop a comprehensive Operational Concept to achieve early benefits from GPS (e.g. direct routing, parallel approaches).				
MT2. Accelerate and expand programs to support GPS/WAAS as a primary navigation system (e.g., airport surveys, update FAA orders, precision approaches, at majority of airports in CONUS, Hawaii, Southern Alaska, and the Caribbean).	h. Architecture issue resolution: Sole means of GPS navigation.				
FAA Office: AND-510 Industry Lead: ATA AOPA	Point of Contact: Mike Shaw Point of Contact: Joe Dorfler Doug Helton		Phone: Phone:	202-358-5432 202-626-4010 301-695-2213	

Note: 950 new approaches are planned annually to completion. Must endure sufficient resources are available to flight check and publish new approach procedures.

Rec #	Initiative	Start	Finish	Status	Funding Profile
MT3. Ensure that requirements for STARS for TRACONs and DSR for ARTCCs be modified to include a provision, i.e., a "hook" for receiving, processing, and displaying ADS-B signals and data link.	a. Data link and ADS-B are pre-planned product improvements in STARS.	1999	2003	STARS Product Team developing PPPI plan that assigns data link functions to first PPPI delivery. ADS-B functionality is assigned to the surveillance enhancement PPPI item.	Not Funded
MT3. Ensure that requirements for STARS for TRACONs and DSR for ARTCCs be modified to include a provision, i.e., a "hook" for receiving, processing, and displaying ADS-B signals and data link.	b. Initial data link interface to host.	1997	20001	R&D T&E completed at WJH Technical Center. Planning to field test at 2 Centers in process.	Not Funded
MT3. Ensure that requirements for STARS for TRACONs and DSR for ARTCCs be modified to include a provision, i.e., a "hook" for receiving, processing, and displaying ADS-B signals and data link.	c. Data link is pre-planned product improvement in DSR replacement.	1999	2005	Data link is a component of the NAS Enroute Architecture. Issues identified in version 2 pertaining to data link implementation in Host Replacement and DSR will be resolved in version 3.	Not Funded
MT3. Ensure that requirements for STARS for TRACONs and DSR for ARTCCs be modified to include a provision, i.e., a "hook" for receiving, processing, and displaying ADS-B signals and data link.	d. ADS-B interface in DSR/host.	2003	2006	ADS-B surveillance is a component of the NAS Architecture and will be included as a requirement in Host replacement and DSR PPPI.	Not Funded
FAA Office: ASD-100 AUA-500 Industry Lead: ATA	Point of Contact: John Horrocks Hugh McLaurin Point of Contact: Ray Hilton		Phone: Phone:	202-358-5429 202-358-5106 202-626-	

Note: Specifications for datalink have been prepared for both STARS and DSR.

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
MT4. Develop and implement technology for the dissemination of weather products and flight information to the cockpit. Development of FIS application standards should be done in coordination with cockpit traffic display standards.	a. GWDS via Mode-S demonstration		6/96	Policy Development Completed.	FY-98 = 0.9M FY-99 = 3.3 M Requested FY-00 = 4.8 M Requested
MT4. Develop and implement technology for the dissemination of weather products and flight information to the cockpit. Development of FIS application standards should be done in coordination with cockpit traffic display standards.	b. Weather information safety study.		3/97	Draft completed. Not plans to publish.	
MT4. Develop and implement technology for the dissemination of weather products and flight information to the cockpit. Development of FIS application standards should be done in coordination with cockpit traffic display standards.	c. Decision on cockpit weather requirements and approach to providing TIS and FIS services to be included in Version 2.0 of NAS Architecture.		3/98	FIS policy statement developed and provided for in NAS Architecture 98. TIS to begin implementation on 3/8/98.	
MT4. Develop and implement technology for the dissemination of weather products and flight information to the cockpit. Development of FIS application standards should be done in coordination with cockpit traffic display standards.	d. Demonstration and analysis of TWIP as ACARS text message.		1/98	Completed.	

MT4. Develop and implement technology for the dissemination of weather products and flight information to the cockpit. Development of FIS application standards should be done in coordination with cockpit traffic display standards.	e. TWIP benefit/cost of in-cockpit weather.	1/96	6/96	Completed.	
MT4. Develop and implement technology for the dissemination of weather products and flight information to the cockpit. Development of FIS application standards should be done in coordination with cockpit traffic display standards.	f. GWS benefit/cost of in-cockpit weather.	3/96	FY-02	CBS now focused on Decision Support Systems Services (DSSS) program.	
MT4. Develop and implement technology for the dissemination of weather products and flight information to the cockpit. Development of FIS application standards should be done in coordination with cockpit traffic display standards.	g. RTCA MOPS for TWIP.	5/96	----	No activity in this area. Decision was that it was not required.	
MT4. Develop and implement technology for the dissemination of weather products and flight information to the cockpit. Development of FIS application standards should be done in coordination with cockpit traffic display standards.	h. Develop implementation plan for TWIP predicated on a favorable CBA.		1/98	Completed. Implementation began 1/98, completed 4/98.	

MT4. Develop and implement technology for the dissemination of weather products and flight information to the cockpit. Development of FIS application standards should be done in coordination with cockpit traffic display standards.	i. GWS demonstration via VHF.	10/98	12/99	Still planned. Will be evaluated as part of the Cargo Airline CRDA and Safe Flight 21.	
FAA Office: AND-470 AND-600/NASA AND-300 Industry Lead: AOPA	Point of Contact: Richard Lay Jim McDaniel Rhonda Thomas Point of Contact: Doug Helton		Phone: Phone:	202-267-7768 202-267-9870 202-638-5020 301-695-2213	

Rec #	Initiative	Start	Finish	Status	Funding Profile
MT5. FAA must develop and deploy dynamic/adaptive sectors as a means to facilitate free flight operations.	a. Provide for improved monitor alert capability to allow for predictions of dynamic density (workload and complexity).			Modernization IPT is planning installation of Initial Conflict Probe (ICP) in 7 en route centers as part of the FFP1 priority commitment. Metrics for measuring workload and complexity must be developed to accommodate a baseline from which to measure actual gains.	
MT5. FAA must develop and deploy dynamic/adaptive sectors as a means to facilitate free flight operations.	**Site by Site (Oceanic, Enroute, Terminal)** b. Evaluate the current practice for adapting sectors to workloads through combining and decombining sectors.	12/97	9/98	Mitre's work plan element for airspace provides for a study and report on existing use of dynamic sectorization. Data are being collected and will be presented with an analysis on how the existing concepts (Concepts in use) can be modified to improve efficiencies in the centers that will be acquiring ICP.	'98 $.5M '99 $4.45M '00 $5M (Planned)
MT5. FAA must develop and deploy dynamic/adaptive sectors as a means to facilitate free flight operations.	**Site by Site (Oceanic, Enroute, Terminal)** c. Evaluate sector structures, procedures, inter/intra facility coordination, staffing, and LOA's that either facilitate or deter adapting sectors. Use Human-in-the-loop (HITL) simulations.	12/97	9/98	As part of the Airspace Planning outcome, Mitre will consider adjunct elements of dynamic sectorization and their affects on planned implementation of ICP and dynamic sectorization in the 7 en route centers identified as initial implementation sites.	
MT5. FAA must develop and deploy dynamic/adaptive sectors as a means to facilitate free flight operations.	**Site by Site (Oceanic, Enroute, Terminal)** d. Determine implications of en route transition sector structure and TRACON operations (manual and CTAS) relative to adapting sector size and configuration. Include departure operations.	12/97	9/98	Modernization IPT is planning installation Traffic Management Advisor (TMA) in 7 en route centers along with 7 terminals using Initial Surface Manager Advisor (SMA) as part of the FFP1 priority commitment. Metrics for measuring workload and complexity must be developed to accommodate a baseline from which to measure actual gains. Individual programs will account for metric and measurement needs to support the associated analysis work.	'98 $.1M '99 $3.5M '00 $4M '01 $2.9M (Planned by Airspace Office To complete Related airspace redesign studies)

MT5. FAA must develop and deploy dynamic/adaptive sectors as a means to facilitate free flight operations.	**Site by Site (Oceanic, Enroute, Terminal)** e. Quantify the effect that dynamic resectorization will have on efficiency, effectiveness, spectrum and communications service volume requirements, and safety.	12/97	9/98	Airspace Planning and Analysis ATA-200 will sponsor studies and analyses from a national perspective, in conjunction with the FFP1 program initiatives. An Eastern Triangle Airspace Redesign work group is being formed to oversee analysis of airspace from New York-Chicago-Miami, as a system. Efficiencies, spectrum, and service volumes are elements germane to the planned study.	'99 $1.95M '00 $3.5M '01 $1.5M '02 $1.5M (Planned needs for national efforts supporting Modernization FFP1 program)
MT5. FAA must develop and deploy dynamic/adaptive sectors as a means to facilitate free flight operations.	**Site by Site (Oceanic, Enroute, Terminal)** f. Identify where dynamic density and/or workload conditions require adaptive sectorization in the current system using HITL simulations.	10/98	9/99	Airspace Planning and Analysis ATA-200 is developing a baseline definition to describe 'system' performance and to function as a measurement point to determine efficiencies gained through dynamic resectorization. Use of the results along with Mitre studies of current use of resectorization will provide a mechanism to help determine where adaptive sectorization may be fruitful in other parts of the system.	'99 $2M '00 $1.5M '01 $1M (Needed as planned to support the planned detailed studies. Not yet identified in the annual budget process)
MT5. FAA must develop and deploy dynamic/adaptive sectors as a means to facilitate free flight operations.	**Site by Site (Oceanic, Enroute, Terminal)** g. Implement additional adaptive sector capability, as required.	7/99	9/00	Activity in other portions of the national airspace system will be driven by the results achieved in the currently planned efforts. Where efficiencies are significantly indicated, additional portions will be added in years after 2005.	(To become part of the standing Ops budget process with justification from study results)
FAA Office: ATA-200 ATO-100 ASD-400 Industry Lead: ATA	Point of Contact: Hal Becker Joe Hart Mark Rogers Point of Contact: Jack Ryan		Phone: Phone:	202-267-9205 202-267-9321 202-358-5372 202-626--4025	

Note: This review should be coordinated with other sites-by-site airspace analyses to maximize study benefits and minimize cost. During high workload conditions during the day, sectors are divided into more manageable volumes, with reduced aircraft densities. During the evening/night, sectors are combined into larger volumes, due to the decrease in aircraft density. Linked to recommendation 24 (dynamic density).

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
MT6. Initiate the development of, and implement, ADS to support user preferred trajectories in non radar areas; includes ground infrastructure (communications and automation) and user equipage.	<u>Domestic airspace</u> a. Develop operational concept and industry benefits analysis for free flight in non-radar and non-towered airport environments.	1/98	10/98	MITRE working w/CAFT to build business case for ADS-B.	See funding comments under Number 18. No FY-98 funding.
MT6. Initiate the development of, and implement, ADS to support user preferred trajectories in non radar areas; includes ground infrastructure (communications and automation) and user equipage.	<u>Domestic airspace</u> b. Conduct alternatives analysis on providing domestic non-radar separation services.			Only being done for ADS-B applications.	
MT6. Initiate the development of, and implement, ADS to support user preferred trajectories in non radar areas; includes ground infrastructure (communications and automation) and user equipage.	<u>Domestic airspace</u> c. Apply lessons learned from Atlanta short-haul trials and Gulf of Mexico to use Alaska as a test site for ADS-B non-radar.	6/02	6/03	This is a Flight 2000 task; won't begin until 2002.	
MT6. Initiate the development of, and implement, ADS to support user preferred trajectories in non radar areas; includes ground infrastructure (communications and automation) and user equipage.	<u>Domestic airspace</u> d. Develop implementation plan for ADS-B in domestic non-radar areas.	2/97	12/98	Draft ADS-B Management Plan written. No FY-98 funding to complete.	
MT6. Initiate the development of, and implement, ADS to support user preferred trajectories in non radar areas; includes ground infrastructure (communications and automation) and user equipage.	<u>Oceanic airspace</u> e. Develop implementation plan for ADS-B in the Oceanic airspace.			No users (airlines) have asked for approval of Oceanic ITC/ITD using ADS-B. ALPA says earlier ITC/ITD demos are "over" until ADS-B IOC.	

MT6. Initiate the development of, and implement, ADS to support user preferred trajectories in non radar areas; includes ground infrastructure (communications and automation) and user equipage.	<u>Oceanic airspace</u> f. Transition strategy between FANS-1 and ATN service regions for digital communications.	1997	2000	No substantive accomplishments.	
MT6. Initiate the development of, and implement, ADS to support user preferred trajectories in non radar areas; includes ground infrastructure (communications and automation) and user equipage.	<u>Oceanic airspace</u> g. Establish 30 mile longitudinal/30 mile horizontal separation standards for the Pacific.	2000	2003	Future activity	
FAA Office: ASD-100 AND-600 Industry Lead: AOPA ATA	Point of Contact: Carmine Primeggia Larry Stotts Point of Contact: Doug Hilton Ray Hilton		Phone: Phone:	202-358-5523 202-358-5033 301-695-2213 202-626-4010	

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
FT1. Expand the number of airports to receive surface surveillance capability.	a. Develop an operational concept for surface surveillance capability.		Complete	*Manual of Advanced Surface Movement Guidance and Control Systems (A-SMGCS)* developed and accepted by the ICAO All Weather Operations Panel. This document contains both the operational concept and operational requirements for surface movement.	
FT1. Expand the number of airports to receive surface surveillance capability.	b. Complete field trial of ASDE-x at Milwaukee, WI.		9/96	Installed and operational.	
FT1. Expand the number of airports to receive surface surveillance capability.	c. Install field trial ASDE-x at Salt Lake City, UT, and complete trials.	5/96	4/97	Unit installed and tested, found to be inadequate. ASDE-3 relocated to SLC.	
FT1. Expand the number of airports to receive surface surveillance capability.	d. Complete testing of runway status lights at Boston (operational assessment).		8/96		
FT1. Expand the number of airports to receive surface surveillance capability.	e. Develop and issue request for information on alternatives to detect and prevent runway incursions.		8/96	Not issued. Funding unavailable in FY 1998 to pursue alternative solicitation. Earliest availability of funding is FY 00.	
FT1. Expand the number of airports to receive surface surveillance capability.	f. FAA decision on additional airports to receive surface surveillance and incursion protection, beyond those scheduled for ASDE-3 and AMASS.			Mission need prepared for JRC 1 approval with goal to accomplish investment analysis and seek acquisition decision by late in FY 1998.	
FT1. Expand the number of airports to receive surface surveillance capability.	g. Conduct an alternatives analysis, including ADS-B, to meet surface surveillance concept of operations.	10/96		Atlanta trials of airport target identification system completed in 9/97, with integration of radar, ADS-B, ATCBI, and multilateration technology. Full-scale demonstration at DFW scheduled for 5/99 dependent upon favorable R,E&D funding in FY 99.	
FT1. Expand the number of airports to receive surface surveillance capability.	h. Develop transition strategy for selected alternative.	4/98	9/98	Described in NAS Architecture and part of Flight 2000 demonstration	
FAA Office: AND-400 ASD-100 Industry Lead: ATA	Point of Contact: Rick Castaldo Mike Harrison Point of Contact: Joe Dorfler		Phone: Phone:	202-358-5170 202-358-5271 202-626-4010	

Note: Funding continues to be the critical program element. If Flight 2000 is funded, surface movement capabilities can be fully integrated. Progress is being made in demonstrating and integrating the technologies; however, the growth in runway incursions centers on general aviation aircraft operations. Much can be done through enforcement actions and training of pilots

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
FT2. The FAA should define a surveillance architecture and infrastructure for en route and terminal airspace incorporating both dependent and independent surveillance elements. The architecture must meet the requirements for reduced separation standards, improved coverage, and lower-cost maintenance determined by other related studies and investigations, and should facilitate enhancing both near-term surveillance capabilities and those required for mature free flight.	a. Maintain surveillance to support separation services; provide additional services that are cost-justified to the FAA and users; and evolve to a flexible surveillance network, consistent with free flight.		Completed	Reflected in the proposed NAS Architecture 98.0	
FT2. The FAA should define a surveillance architecture and infrastructure for en route and terminal airspace incorporating both dependent and independent surveillance elements. The architecture must meet the requirements for reduced separation standards, improved coverage, and lower-cost maintenance determined by other related studies and investigations, and should facilitate enhancing both near-term surveillance capabilities and those required for mature free flight.	b. Issue the surveillance transition plan.		6/96	NAS Architecture 98 includes information regarding surveillance transition. The FAA is currently conducting mission analysis on separation and developing a plan for future analyses.	Not Funded

FT2. The FAA should define a surveillance architecture and infrastructure for en route and terminal airspace incorporating both dependent and independent surveillance elements. The architecture must meet the requirements for reduced separation standards, improved coverage, and lower-cost maintenance determined by other related studies and investigations, and should facilitate enhancing both near-term surveillance capabilities and those required for mature free flight.	c. Complete modernization of the surveillance infrastructure: – ARSR-4 – Replacement of ASR-7's by ASR-11's – Upgrade of ASR-8's with MTD processor – Replace ATCBI-4/5 with monopulse SSR.			The ARSR-4 is a joint program between FAA and the Department of Defense (DOD). Forty ARSR-4 radars will be deployed on the periphery of the United States. The first system installed was Mt. Laguna, CA on October 1990 and the first site commission was Tamiami, FL on June 1996. The ARSR-4 program plans to be completed in 1998. The ASR-11 is a joint program between the FAA and DOD to replace aging ASR-7's, ASR-8's, and DOD takeovers, provide for new establishments, and provide digitization for the Standard Terminal Automation and Replacement (STARS). The FAA is estimated to buy 34 ASR-11 radars. The first ASR-11 operational readiness demonstration (ORD) by June 1999 and the last ORD by July 2005.	Fully Funded
FT2. The FAA should define a surveillance architecture and infrastructure for en route and terminal airspace incorporating both dependent and independent surveillance elements. The architecture must meet the requirements for reduced separation standards, improved coverage, and lower-cost maintenance determined by other related studies and investigations, and should facilitate enhancing both near-term surveillance capabilities and those required for mature free flight.	d. Define surveillance architecture, to include ADS-B considerations, in Version 2.5 of NAS Architecture.			ADS-B and cockpit-based capabilities are reflected in the NAS Architecture 2.0, as well as air-ground surveillance capabilities (operational circa 2008).	Not Funded
FAA Office: ASD-100 Industry Lead: ATA	Point of Contact: Ann Tedford Point of Contact: Joe Dorfler		Phone: Phone:	202-358-5432 202-626-4010	

Free Flight Action Plan Update II

Rec #	Initiative	Start	Finish	Status	Funding Profile
FT3. Determine LAAS capability to enable increased availability of CAT I, II, III approaches and implement LAAS, as appropriate.	a. Complete LAAS feasibility study for CAT III precision approach.		8/95		
FT3. Determine LAAS capability to enable increased availability of CAT I, II, III approaches and implement LAAS, as appropriate.	b. Conduct simulation tests to validate the study.		12/95		
FT3. Determine LAAS capability to enable increased availability of CAT I, II, III approaches and implement LAAS, as appropriate.	c. Complete MASPS/MOPS for LAAS.		12/98		
FAA Office: AND-500 Industry Lead: ATA AOPA	Point of Contact: Ray Swider Point of Contact: Joe Dorfler Doug Helton		Phone: Phone:	202-358-5382 202-626-4010 301-695-2213	

4-D	Four Dimensional - Position plus Time
ADS-B	Automated Dependent Surveillance - Broadcast
AIP	Airport improvement Program
AMASS	Airport Movement Area Safety System
AOAS	Advanced Oceanic Automation System
AOC	Airline operations Center
ARINC	Aeronautical Radio, Inc.
ARSR	Air Route Surveillance Radar
ARTCC	Air Route Traffic Control Center
ASDE	Airport Surface Detection Equipment
ASR	Airport Surveillance Radar
ATA	Air Transport Association
ATC	Air Traffic Control
ATCBI	Air Traffic Control Beacon Interrogator
ATCSCC	Air Traffic Control System Command Center
ATM	Air Traffic Management
ATN	Aeronautical Telecommunications Network
ATPAC	Air Traffic Procedures Advisory Committee
CASTWG	Converging Approach Standards Working Group
CAT	Category (used with precision approach categories)
CDTI	Cockpit Display of Traffic Information
CNS	Communications, Navigation, and Surveillance
CTA	Controlled Time of Arrival
CTAS	Center TRACON Automation System
D-ATIS	Digital Automatic Terminal Information Service
DFW	Dallas-Ft. Worth International Airport
DOD	Department of Defense
DOTS	Dynamic Ocean Tracking System
DSR	Display System Replacement
ETMS	Enhanced Traffic Management System
FAA	Federal Aviation Administration
FADE	FAA-Airline Data Exchange
FL	Flight Level
FSD	Full Scale Development
GPS	Global Positioning System
GWS	Graphical Weather Services
HITL	Human-in-the-Loop Simulations
ICAO	International Civil Aviation Organization
Loc	Initial Operational Capability
LAAS	Local Area Augmentation System
LEO	Low Earth Orbit
MASPS	Minimum Aviation System Performance Standard
MDCRS	Meteorological Data Collection and Reporting System
MEO	Medium Earth Orbit
MOIE	Mission Oriented Investigation and Experiment
MOPS	Minimum Operational Performance Standard
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NCP	NAS Change Proposal

List of Acronyms

nm	Nautical Mile
NRP	National Route Program
ORD	Chicago-O'Hare International Airport
PDC	Pre-departure Clearance
PFC	Passenger Facility Charge
PRAT	Prediction/Resolution Advisor-y Tool
RNAV	Area Navigation
RTCA	RTCA, Inc.
RTCA SC	Special Committee of RTCA
RVSM	Reduced Vertical Separation Minima
SAE	Society of Automotive Engineers
SATORI	Systematic Air Traffic Operations Research Initiative
SID	Standard Instrument Departure
SMA	Surface Movement Advisor
SSR	Secondary Surveillance Radar
STAR	Standard Terminal Arrival Route
STARS	Standard Terminal Automation Replacement System
SUA	Special Use Airspace
TBD	To Be Determined
TDMA	Time Division Multiple Access
TFM	Traffic Flow Management
TRACON	Terminal Radar Approach Control
TSO	Technical Standards Order
TWIP	Terminal Weather Information for Pilots
UPR	User Preferred Routing
URET	User Request Evaluation Tool
VHF	Very-high Frequency
WAAS	Wide Area Augmentation System
WG	Working Group
WGS-84	World Geodetic Survey - 1984